



# BERLOY METAL LUMBER

THE BERGER MFG. CO.

1701-1729 Broadway, N. E.  
Minneapolis, Minn.



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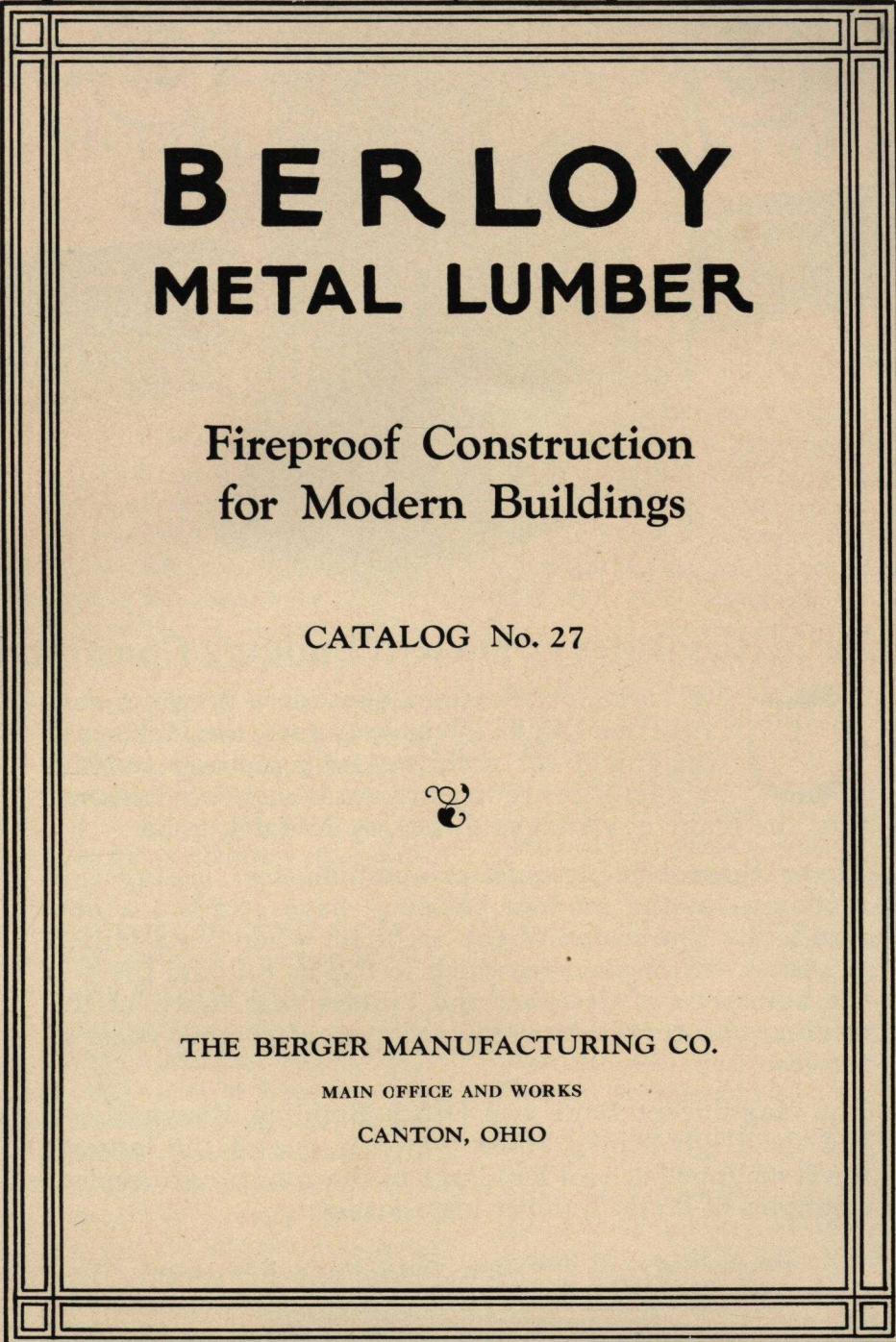
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# **BERLOY METAL LUMBER**

Fireproof Construction  
for Modern Buildings

CATALOG No. 27



THE BERGER MANUFACTURING CO.

MAIN OFFICE AND WORKS

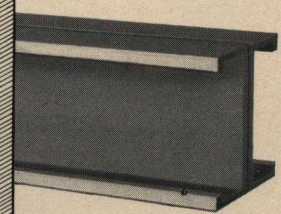
CANTON, OHIO







The First National Bank  
Canton, Ohio



Frank L. Packard  
Architect

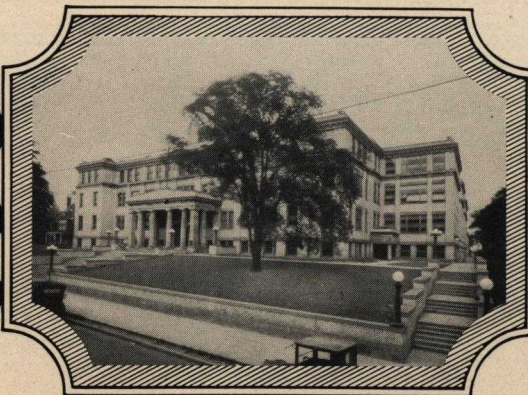
## The Basic Requisites of Modern Building Construction

**T**HE rigid specifications of modern fireproof construction can be adequately met, the ideals and designs of the architect fully realized and the builder's desire for structural economy satisfied thru the many advantages of Berloy Metal Lumber.

These three basic requisites—permanence, beauty and economy—in the modern building, have attained a new standard. The vision of the architect when materialized is a safer, better place in which to live or toil and there is the assurance of designer and builder that much of the original beauty will be preserved even after long years of service.

The magnificent Bank and Office Building shown above and the High School below which is one of the largest, finest equipped school buildings in the country are typical examples of Metal Lumber installations.

McKinley High School, Canton, Ohio. Over 63 Miles of Metal Lumber.  
George F. Hammond, Cleveland, O., Architect.





## Advantages and Economies of Berloy Metal Lumber Construction

Standard Metal Lumber Construction consists of Metal Lumber sections of correct size, properly spaced and bridged and with a 2" concrete slab over metal lath on top of joists and with a  $\frac{7}{8}$ " cement or gypsum plastered ceiling on the underside of the joists. The fireproofness of this type of construction has been demonstrated not only in authentic fire tests, but in actual fires.

The Metal Lumber type of construction with all fabricating completed under factory supervision removes the uncertainty of field labor and the use of structural materials of varying quality. A speed in erection not attained in any other type of construction is possible regardless of weather conditions with labor costs proportionately less.

The joists and studs are furnished cut to length, fabricated complete with all necessary connections and accessories. Without special equipment a small working force can install this type of floor in a minimum amount of time, completing as many floors simultaneously as the preliminary work will permit.

All sections are carefully and accurately proportioned as to size and load carrying capacities within the range of joist and stud requirements.

There is no excess weight or waste of space in the finished structure. With a saving of 40% to 70% in dead weight over other types of fireproof construction, Metal Lumber effects substantial savings in the footings, foundations, superstructure and all load carrying members. The low cost of transportation, the small unprotected storage space required at the building site, the adaptability, ease, speed of erection, result in savings to the architect, builder and owner that demand careful consideration.

These advantages and savings are proportionately the same whether the project is a two-story dwell-

ing or a lofty skyscraper. The installation of wood has long been a simple operation in building construction. Metal Lumber has modernized this older type of construction with a fireproof building material, furnished in exact lengths easily handled by two men and requiring even less labor to install.

In hotels, apartments, hospitals, schools, office buildings, etc., the soundproofness of Metal Lumber construction is an appreciated advantage. With a simplified definition of sound as the transmission of vibration by molecular action through bodies, consider the barrier against this sound transmission afforded by Metal Lumber construction. It is an accepted fact that vibrations travel readily thru a continuous material of the same density. The non-conductivity of Metal Lumber floors can be fully appreciated when you consider that sound vibrations must travel thru a layer of concrete, thru Metal Lumber joists or the air space between floor and ceiling and then thru a layer of plaster. While the air space is the main barrier to sound in this type of construction, the varying densities of the other materials are an added resistance that cannot be overlooked in the selection of a floor construction. The absolute proof of the theory of sound non-conductivity in Metal Lumber structures has been proven a practical certainty wherever standard construction, as described in this booklet, has been carried out.

The ever-increasing use of Berloy Metal Lumber and its imperviousness to weather conditions is helping to remove some of the peaks and valleys of the building industry. It is a well-known fact that buildings started in winter months are served by an abundance of labor, that materials at rock-bottom prices are promptly available. The building can in most instances be completed and earning money on the investment by the time other builders are bidding for labor and materials.



## Fire-Resistive Construction

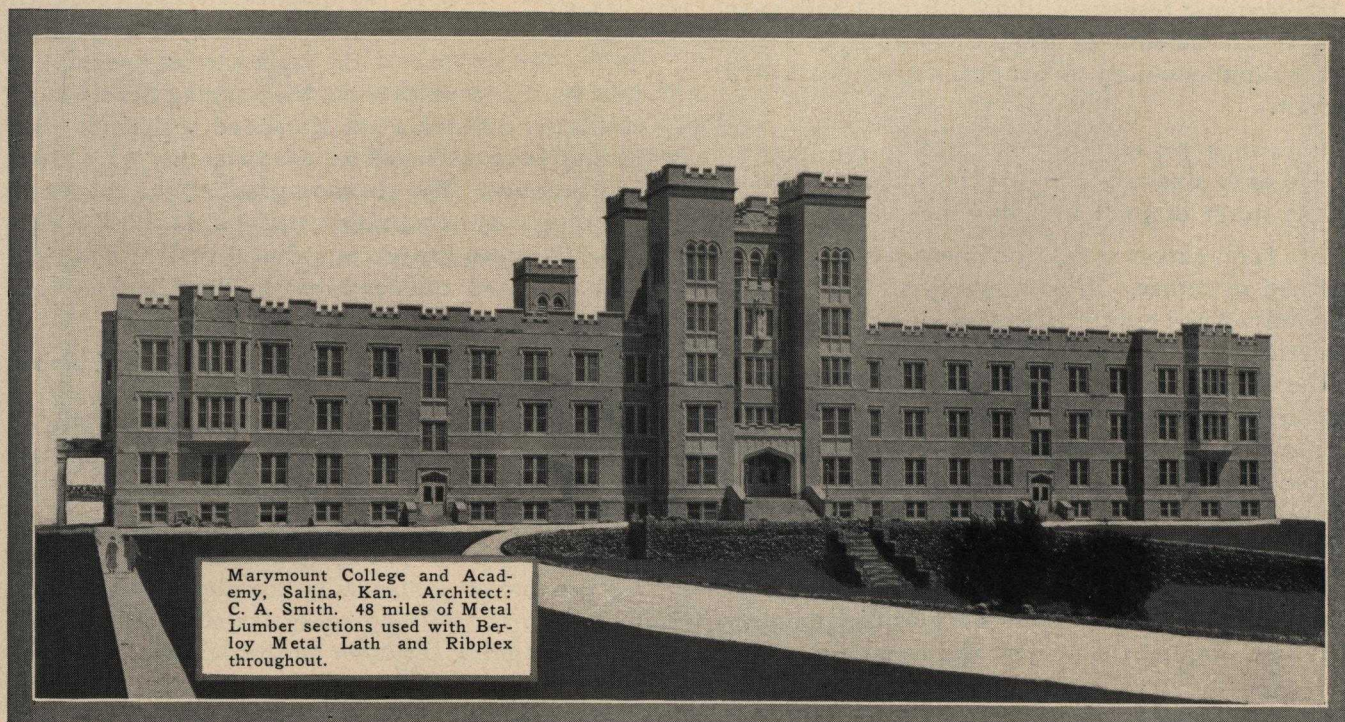
The steel used in Metal Lumber is made from selected ore reduced to pig iron in the blast furnace, refined into steel by the open-hearth process, cast into ingots and rolled, by successive reductions into blooms, slabs and strip steel. It is then formed into the final channel shape. Two of these channels are then spot welded, back to back, forming the Metal Lumber I section as illustrated throughout this reference book.

At no time during the reduction of the original open-hearth ingot, is the steel rolled AFTER crystallization has begun or into other than flat sections. Consequently, internal stresses are not introduced. From the time the billet or bloom reaches the first rolls at a temperature of about 2000° F. until it has been reduced in thickness and increased in length by passing rapidly thru a series of rolls, it leaves the last rolls as strip steel at a temperature of approximately 1300° F. The pro-

duction of strip steel at a temperature in excess of 1300° F. with the direction of the long longitudinal fibers unchanged thruout the process is productive of a strip that is practically annealed and without internal stresses.

Such steel will not fail unless heated to the melting point (about 2600° F.) or very heavily overloaded. It is to be remembered that temperatures which will melt steel are hard to produce and not existent except in more than ordinary fires.

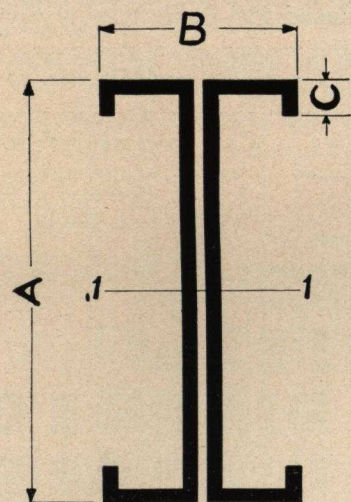
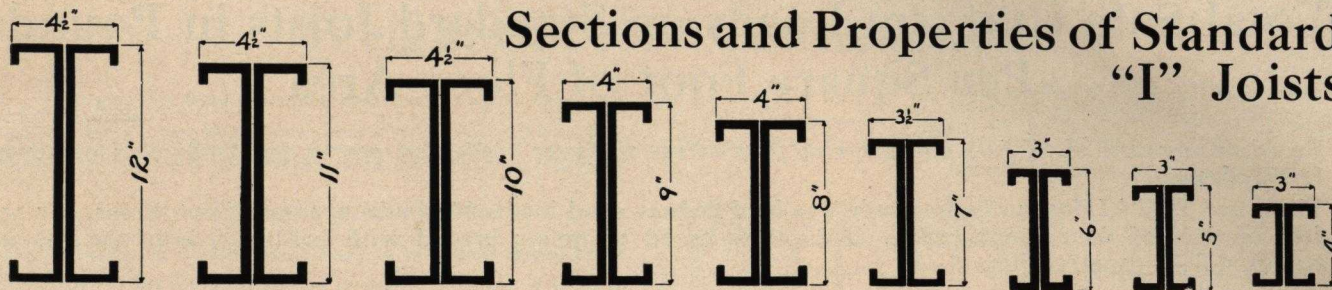
While Metal Lumber greatly resembles Structural Steel in shape, there is a decided difference in their physical structure and fire-resisting qualities. The rolling process as explained above and the uniform thickness of strip steel, from which metal lumber sections are fabricated, eliminate internal stresses. Consequently metal lumber requires less protection and withstands a continued high temperature longer than structural steel.



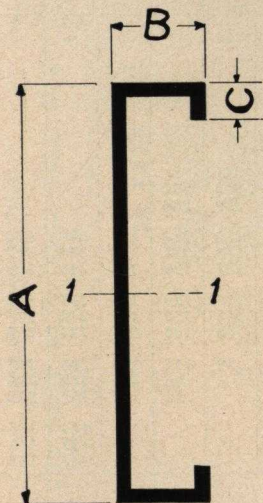
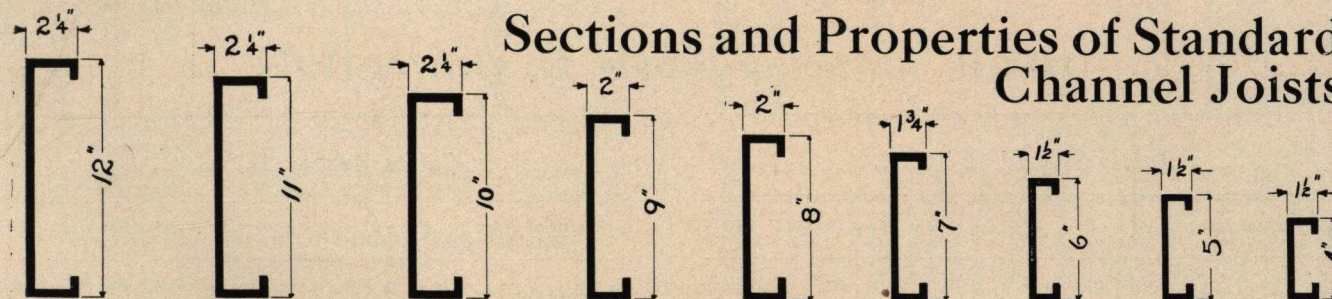


## STEEL JOISTS

## STEEL STUDS

Sections and Properties of Standard  
"I" Joists

| Depth<br>A | Flange<br>Dimensions |     | Wt., Lbs.,<br>per<br>Lineal<br>Foot | Thick-<br>ness of<br>Metal<br>in In. | Thick-<br>ness of<br>Web, In. | Area<br>of Sec.,<br>Sq. In. | Axis 1—1             |                       |                    |
|------------|----------------------|-----|-------------------------------------|--------------------------------------|-------------------------------|-----------------------------|----------------------|-----------------------|--------------------|
|            | B                    | C   |                                     |                                      |                               |                             | Moment<br>of Inertia | Radius of<br>Gyration | Section<br>Modulus |
| 4          | 3                    | 1/2 | 3.7                                 | .072                                 | .144                          | 1.08                        | 2.60                 | 1.552                 | 1.30               |
| 5          | 3                    | 1/2 | 4.2                                 | .072                                 | .144                          | 1.22                        | 4.38                 | 1.895                 | 1.75               |
| 6          | 3                    | 1/2 | 4.7                                 | .072                                 | .144                          | 1.37                        | 6.90                 | 2.244                 | 2.30               |
| 7          | 3 1/2                | 5/8 | 5.5                                 | .072                                 | .144                          | 1.62                        | 11.20                | 2.629                 | 3.20               |
| 8          | 4                    | 5/8 | 6.1                                 | .072                                 | .144                          | 1.80                        | 16.80                | 3.055                 | 4.20               |
| 9          | 4                    | 3/4 | 7.0                                 | .075                                 | .150                          | 2.06                        | 23.85                | 3.403                 | 5.30               |
| 10         | 4 1/2                | 3/4 | 8.0                                 | .078                                 | .156                          | 2.38                        | 33.25                | 3.738                 | 6.65               |
| 11         | 4 1/2                | 3/4 | 9.5                                 | .086                                 | .172                          | 2.80                        | 46.20                | 4.062                 | 8.40               |
| 12         | 4 1/2                | 3/4 | 10.5                                | .090                                 | .180                          | 3.10                        | 60.00                | 4.399                 | 10.00              |

Sections and Properties of Standard  
Channel Joists

| Depth<br>A | Flange<br>Dimensions |     | Wt., Lbs.,<br>per<br>Lineal<br>Foot | Thick-<br>ness of<br>Metal<br>in In. | Area<br>of Sec.,<br>Sq. In. | Axis 1—1             |                       |                    |
|------------|----------------------|-----|-------------------------------------|--------------------------------------|-----------------------------|----------------------|-----------------------|--------------------|
|            | B                    | C   |                                     |                                      |                             | Moment<br>of Inertia | Radius of<br>Gyration | Section<br>Modulus |
| 4          | 1 1/2                | 1/2 | 1.85                                | .072                                 | 0.54                        | 1.30                 | 1.552                 | 0.65               |
| 5          | 1 1/2                | 1/2 | 2.10                                | .072                                 | 0.61                        | 2.19                 | 1.895                 | 0.88               |
| 6          | 1 1/2                | 1/2 | 2.35                                | .072                                 | 0.69                        | 3.45                 | 2.244                 | 1.15               |
| 7          | 1 3/4                | 5/8 | 2.75                                | .072                                 | 0.81                        | 5.60                 | 2.629                 | 1.60               |
| 8          | 2                    | 5/8 | 3.05                                | .072                                 | 0.90                        | 8.40                 | 3.055                 | 2.10               |
| 9          | 2                    | 3/4 | 3.50                                | .075                                 | 1.03                        | 11.93                | 3.403                 | 2.65               |
| 10         | 2 1/4                | 3/4 | 4.00                                | .078                                 | 1.19                        | 16.63                | 3.738                 | 3.33               |
| 11         | 2 1/4                | 3/4 | 4.75                                | .086                                 | 1.40                        | 23.10                | 4.062                 | 4.20               |
| 12         | 2 1/4                | 3/4 | 5.25                                | .090                                 | 1.55                        | 30.00                | 4.399                 | 5.00               |



## STEEL JOISTS

## STEEL STUDS

# Total Safe Uniform Loads on Standard Joists in Pounds Per Square Foot of Floor Area

Based on moment of  $W L/8$  and extreme fiber stress not over 16,000 lbs. per sq. in. Deflection not over  $1/360$  of span.

These are TOTAL loads. To find safe live load deduct dead load which will average about 40 lbs. per sq. foot of finished floor construction. All values based on joists braced with bridging, lath, etc., as in standard floor construction.

Joists Spaced 24" C. C.

| Depth of Joist     | 4"  | 5"  | 6"  | 7"  | 8"  | 9"  | 10" | 11" | 12"  |
|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|
| Wt. per Lineal Ft. | 3.7 | 4.2 | 4.7 | 5.5 | 6.1 | 7.0 | 8.0 | 9.5 | 10.5 |
| CLEAR SPAN IN FEET | 6   | 193 |     |     |     |     |     |     |      |
|                    | 7   | 142 | 191 |     |     |     |     |     |      |
|                    | 8   | 108 | 146 | 192 |     |     |     |     |      |
|                    | 9   | 77  | 115 | 152 | 211 |     |     |     |      |
|                    | 10  | 56  | 94  | 123 | 171 |     |     |     |      |
|                    | 11  | 42  | 70  | 102 | 141 |     |     |     |      |
|                    | 12  | 32  | 54  | 85  | 119 | 156 |     |     |      |
|                    | 13  |     | 43  | 67  | 101 | 133 | 167 |     |      |
|                    | 14  |     | 34  | 54  | 87  | 115 | 144 |     |      |
|                    | 15  |     |     | 44  | 71  | 100 | 126 | 158 | 199  |
|                    | 16  |     |     | 37  | 59  | 88  | 111 | 139 | 175  |
|                    | 17  |     |     |     | 49  | 74  | 98  | 123 | 155  |
|                    | 18  |     |     |     | 41  | 62  | 88  | 110 | 139  |
|                    | 19  |     |     |     |     | 53  | 75  | 99  | 124  |
|                    | 20  |     |     |     |     | 45  | 64  | 89  | 112  |
|                    | 21  |     |     |     |     | 39  | 56  | 78  | 102  |
|                    | 22  |     |     |     |     |     | 48  | 67  | 93   |
|                    | 23  |     |     |     |     |     | 42  | 59  | 82   |
|                    | 24  |     |     |     |     |     |     | 52  | 72   |
|                    | 25  |     |     |     |     |     |     | 46  | 64   |
|                    | 26  |     |     |     |     |     |     | 41  | 57   |

Joists Spaced 19" C. C.

| Depth of Joist     | 4"  | 5"  | 6"  | 7"  | 8"  | 9"  | 10" | 11" | 12"  |
|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|
| Wt. per Lineal Ft. | 3.7 | 4.2 | 4.7 | 5.5 | 6.1 | 7.0 | 8.0 | 9.5 | 10.5 |
| CLEAR SPAN IN FEET | 6   | 244 |     |     |     |     |     |     |      |
|                    | 7   | 179 | 240 |     |     |     |     |     |      |
|                    | 8   | 137 | 184 | 241 |     |     |     |     |      |
|                    | 9   | 97  | 146 | 191 | 266 |     |     |     |      |
|                    | 10  | 71  | 118 | 155 | 216 |     |     |     |      |
|                    | 11  | 53  | 89  | 128 | 178 |     |     |     |      |
|                    | 12  | 40  | 69  | 107 | 149 | 196 |     |     |      |
|                    | 13  |     | 54  | 85  | 127 | 167 | 211 |     |      |
|                    | 14  |     | 43  | 68  | 110 | 145 | 182 |     |      |
|                    | 15  |     |     | 55  | 90  | 126 | 159 | 199 | 252  |
|                    | 16  |     |     | 46  | 74  | 110 | 140 | 175 | 221  |
|                    | 17  |     |     |     | 62  | 93  | 124 | 155 | 196  |
|                    | 18  |     |     |     | 52  | 78  | 110 | 138 | 175  |
|                    | 19  |     |     |     |     | 66  | 95  | 124 | 157  |
|                    | 20  |     |     |     |     | 57  | 81  | 112 | 141  |
|                    | 21  |     |     |     |     | 49  | 70  | 98  | 128  |
|                    | 22  |     |     |     |     |     | 61  | 85  | 117  |
|                    | 23  |     |     |     |     |     | 53  | 74  | 103  |
|                    | 24  |     |     |     |     |     |     | 65  | 91   |
|                    | 25  |     |     |     |     |     |     | 57  | 80   |
|                    | 26  |     |     |     |     |     |     | 51  | 71   |

Joists Spaced 16" C. C.

| Depth of Joist     | 4"  | 5"  | 6"  | 7"  | 8"  | 9"  | 10" | 11" | 12"  |
|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|
| Wt. per Lineal Ft. | 3.7 | 4.2 | 4.7 | 5.5 | 6.1 | 7.0 | 8.0 | 9.5 | 10.5 |
| CLEAR SPAN IN FEET | 6   | 289 |     |     |     |     |     |     |      |
|                    | 7   | 212 | 286 |     |     |     |     |     |      |
|                    | 8   | 163 | 219 | 287 |     |     |     |     |      |
|                    | 9   | 116 | 173 | 227 | 316 |     |     |     |      |
|                    | 10  | 84  | 140 | 184 | 256 |     |     |     |      |
|                    | 11  | 63  | 106 | 152 | 212 |     |     |     |      |
|                    | 12  | 48  | 82  | 128 | 178 | 234 |     |     |      |
|                    | 13  |     | 64  | 101 | 152 | 199 | 251 |     |      |
|                    | 14  |     | 51  | 81  | 130 | 172 | 216 |     |      |
|                    | 15  |     |     | 66  | 107 | 150 | 188 | 236 | 299  |
|                    | 16  |     |     | 54  | 88  | 131 | 166 | 208 | 262  |
|                    | 17  |     |     |     | 74  | 110 | 147 | 184 | 232  |
|                    | 18  |     |     |     | 62  | 93  | 131 | 164 | 208  |
|                    | 19  |     |     |     |     | 79  | 113 | 147 | 186  |
|                    | 20  |     |     |     |     | 68  | 96  | 133 | 168  |
|                    | 21  |     |     |     |     | 58  | 83  | 115 | 152  |
|                    | 22  |     |     |     |     |     | 72  | 101 | 139  |
|                    | 23  |     |     |     |     |     | 63  | 88  | 123  |
|                    | 24  |     |     |     |     |     |     | 77  | 108  |
|                    | 25  |     |     |     |     |     |     | 68  | 95   |
|                    | 26  |     |     |     |     |     |     | 61  | 85   |

Joists Spaced 12" C. C.

| Depth of Joist     | 4"  | 5"  | 6"  | 7"  | 8"  | 9"  | 10" | 11" | 12"  |
|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|
| Wt. per Lineal Ft. | 3.7 | 4.2 | 4.7 | 5.5 | 6.1 | 7.0 | 8.0 | 9.5 | 10.5 |
| CLEAR SPAN IN FEET | 6   | 385 |     |     |     |     |     |     |      |
|                    | 7   | 283 | 381 |     |     |     |     |     |      |
|                    | 8   | 217 | 292 | 383 |     |     |     |     |      |
|                    | 9   | 154 | 231 | 303 | 421 |     |     |     |      |
|                    | 10  | 112 | 187 | 245 | 341 |     |     |     |      |
|                    | 11  | 84  | 141 | 203 | 282 |     |     |     |      |
|                    | 12  | 64  | 109 | 170 | 237 | 311 |     |     |      |
|                    | 13  |     | 86  | 134 | 202 | 265 | 334 |     |      |
|                    | 14  |     | 68  | 108 | 174 | 229 | 288 |     |      |
|                    | 15  |     |     | 88  | 142 | 199 | 251 | 315 | 398  |
|                    | 16  |     |     | 73  | 118 | 175 | 221 | 277 | 350  |
|                    | 17  |     |     |     | 98  | 147 | 196 | 246 | 310  |
|                    | 18  |     |     |     | 82  | 124 | 175 | 219 | 277  |
|                    | 19  |     |     |     |     | 105 | 150 | 197 | 248  |
|                    | 20  |     |     |     |     | 90  | 128 | 177 | 224  |
|                    | 21  |     |     |     |     |     | 111 | 155 | 203  |
|                    | 22  |     |     |     |     |     | 96  | 134 | 185  |
|                    | 23  |     |     |     |     |     | 84  | 117 | 164  |
|                    | 24  |     |     |     |     |     |     | 103 | 144  |
|                    | 25  |     |     |     |     |     |     | 91  | 127  |
|                    | 26  |     |     |     |     |     |     | 81  | 113  |



## Weight of Floor Construction

Fig. 1 showing fireproof floors of equal live load capacity on equal spans needs but little comment.  
"Less than half the dead weight of any other fireproof construction to carry the same live load" is a statement which explains the economy of using Metal Lumber, not only in the floors themselves but extending also to the supporting structure.

### Estimating Dead Load of Floors

For making rough estimates 40 lbs. for wood, and 42 lbs. for tile, terrazzo or cement finished floors is a safe general dead load for finished Metal Lumber floor construction.

The weights of joists in various spacings as noted below added to weight of the rest of the construction (about 4 lbs. for wood, 6 lbs. for tile, terrazzo or cement, 21 lbs. for concrete fill and 8 lbs. for ceiling) will give much more accurate estimates.

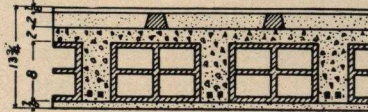
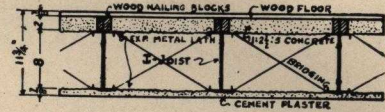
### Approximate Weights of Joists per Sq. Ft. of Floor Area

Use net area of floor in estimating. Material for laps and bearings is included in weights below.

| Lineal ft. of Joists<br>per sq. ft. of floor |                       | 1.05                                     | .94   | .80  | .65        | .55  |
|----------------------------------------------|-----------------------|------------------------------------------|-------|------|------------|------|
| SPACING                                      |                       | 12"                                      | 13 ½" | 16"  | 19" or 20" | 24"  |
| Depth<br>of Joist                            | Wt. per<br>Lineal Ft. | Weight in lbs. per sq. ft. of floor area |       |      |            |      |
| 4"                                           | 3.7 lb.               | 3.88                                     | 3.48  | 2.96 | 2.40       | 2.04 |
| 5"                                           | 4.2 lb.               | 4.41                                     | 3.95  | 3.36 | 2.73       | 2.31 |
| 6"                                           | 4.7 lb.               | 4.94                                     | 4.42  | 3.76 | 3.05       | 2.58 |
| 7"                                           | 5.5 lb.               | 5.78                                     | 5.17  | 4.40 | 3.57       | 3.02 |
| 8"                                           | 6.1 lb.               | 6.40                                     | 5.73  | 4.88 | 3.96       | 3.35 |
| 9"                                           | 7.0 lb.               | 7.35                                     | 6.58  | 5.60 | 4.55       | 3.85 |
| 10"                                          | 8.0 lb.               | 8.40                                     | 7.52  | 6.40 | 5.20       | 4.40 |
| 11"                                          | 9.5 lb.               | 9.97                                     | 8.92  | 7.60 | 6.17       | 5.22 |
| 12"                                          | 10.5 lb.              | 11.00                                    | 9.87  | 8.40 | 6.83       | 5.78 |

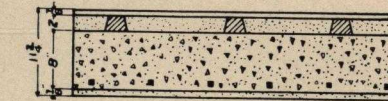
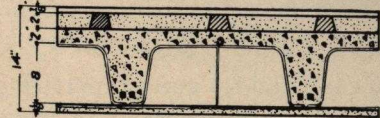
Weights given above are approximate for short cut estimating and checking.

Berloy Metal Lumber  
Weight, 35 lbs. per sq. ft.



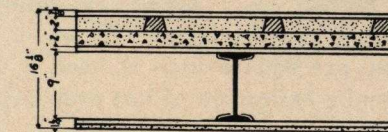
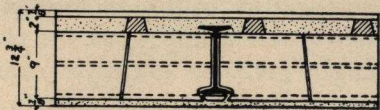
Concrete Joist  
Hollow Tile  
Weight, 102 lbs. per sq. ft.

Concrete Joist  
Steel Cores  
Weight, 86 lbs. per sq. ft.



Reinforced Concrete Slab  
Weight, 130 lbs. per sq. ft.

Flat Tile Arch  
Weight 70 lbs. per sq. ft.



Concrete Slab  
Plate Reinforcement  
Weight, 74 lbs. per sq. ft.

Figure 1

## Deflection of Metal Lumber Joists

Table below gives the maximum stress in steel which may be used for beams of various depths which will not cause deflection exceeding 1/360 of the span, beyond which plaster will usually crack.

Table on right gives factors which may be used in determining the deflection which will occur when the steel in joists is stressed beyond the limits noted in the table below.

TABLE OF ALLOWABLE UNIT FIBRE STRESSES FOR  
PRESSED STEEL JOISTS

| Depth of Beam | 4"    | 5"    | 6"    | 7"    | 8"    | 9"    | 10"   | 11"   | 12"   |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 9             | 14700 |       |       |       |       |       |       |       |       |
| 10            | 13200 | 16000 |       |       |       |       |       |       |       |
| 11            | 12000 | 15000 |       |       |       |       |       |       |       |
| 12            | 11000 | 13725 | 16000 |       |       |       |       |       |       |
| 13            | 9700  | 12650 | 15150 |       |       |       |       |       |       |
| 14            | 9450  | 11750 | 14050 | 16000 |       |       |       |       |       |
| 15            | 8800  | 11000 | 13150 | 15300 |       |       |       |       |       |
| 16            | 8260  | 10300 | 12310 | 14350 | 16000 |       |       |       |       |
| 17            | 7775  | 9690  | 11600 | 13500 | 15400 |       |       |       |       |
| 18            |       | 9150  | 10950 | 12750 | 14550 | 16000 |       |       |       |
| 19            |       | 8670  | 10350 | 12070 | 13750 | 15450 |       |       |       |
| 20            |       | 8235  | 9850  | 11450 | 13100 | 14700 | 16000 |       |       |
| 21            |       | 7895  | 9380  | 10900 | 12450 | 13950 | 15550 |       |       |
| 22            |       |       | 8955  | 10430 | 11900 | 13400 | 14850 | 16000 |       |
| 23            |       |       | 8565  | 9975  | 11400 | 12650 | 14200 | 15600 |       |
| 24            |       |       | 8210  | 9560  | 10900 | 12250 | 13600 | 14930 | 16000 |
| 25            |       |       |       |       |       | 11750 | 13040 | 14340 | 15630 |
| 26            |       |       |       |       |       | 11290 | 12530 | 13780 | 15030 |
| 27            |       |       |       |       |       | 10910 | 12080 | 13280 | 14480 |
| 28            |       |       |       |       |       |       | 11640 | 12790 | 13950 |
| 29            |       |       |       |       |       |       | 11240 | 12360 | 13510 |
| 30            |       |       |       |       |       |       | 10870 | 11950 | 13030 |

COEFFICIENTS OF DEFLECTION, UNIFORMLY  
DISTRIBUTED LOADS

| Span in Feet | Fibre Stress, lbs. per sq. in. |        |       |       | Span in Feet | Fibre Stress, lbs. per sq. in. |        |        |        |
|--------------|--------------------------------|--------|-------|-------|--------------|--------------------------------|--------|--------|--------|
|              | 16000                          | 15500  | 15000 | 14500 |              | 16000                          | 15500  | 15000  | 14500  |
| 1            | 0.017                          | 0.016  | 0.016 | 0.015 | 26           | 11.189                         | 10.839 | 10.489 | 10.140 |
| 2            | 0.066                          | 0.064  | 0.062 | 0.060 | 27           | 12.066                         | 11.689 | 11.312 | 10.935 |
| 3            | 0.149                          | 0.144  | 0.139 | 0.135 | 28           | 12.977                         | 12.571 | 12.166 | 11.760 |
| 4            | 0.265                          | 0.257  | 0.248 | 0.240 | 29           | 13.920                         | 13.485 | 13.050 | 12.615 |
| 5            | 0.414                          | 0.401  | 0.388 | 0.375 | 30           | 14.897                         | 14.431 | 13.966 | 13.500 |
| 6            | 0.596                          | 0.577  | 0.558 | 0.540 | 31           | 15.906                         | 15.409 | 14.912 | 14.415 |
| 7            | 0.811                          | 0.785  | 0.760 | 0.735 | 32           | 16.949                         | 16.419 | 15.890 | 15.360 |
| 8            | 1.059                          | 1.025  | 0.992 | 0.959 | 33           | 18.025                         | 17.461 | 16.898 | 16.335 |
| 9            | 1.341                          | 1.300  | 1.256 | 1.215 | 34           | 19.134                         | 18.536 | 17.938 | 17.340 |
| 10           | 1.655                          | 1.603  | 1.552 | 1.500 | 35           | 20.276                         | 19.642 | 19.009 | 18.375 |
| 11           | 2.003                          | 1.940  | 1.878 | 1.814 | 36           | 21.451                         | 20.780 | 20.110 | 19.440 |
| 12           | 2.383                          | 2.308  | 2.234 | 2.160 | 37           | 22.659                         | 21.950 | 21.243 | 20.535 |
| 13           | 2.797                          | 2.710  | 2.624 | 2.534 | 38           | 23.901                         | 23.154 | 22.407 | 21.660 |
| 14           | 3.244                          | 3.143  | 3.044 | 2.939 | 39           | 25.175                         | 24.394 | 23.605 | 22.815 |
| 15           | 3.724                          | 3.607  | 3.491 | 3.375 | 40           | 26.483                         | 25.654 | 24.827 | 24.000 |
| 16           | 4.237                          | 4.104  | 3.977 | 3.845 | 41           | 27.823                         | 26.960 | 26.085 | 25.215 |
| 17           | 4.783                          | 4.633  | 4.484 | 4.334 | 42           | 29.197                         | 28.284 | 27.372 | 26.460 |
| 18           | 5.363                          | 5.195  | 5.028 | 4.860 | 43           | 30.604                         | 29.646 | 28.690 | 27.734 |
| 19           | 5.975                          | 5.788  | 5.602 | 5.415 | 44           | 32.044                         | 31.050 | 30.075 | 29.052 |
| 20           | 6.621                          | 6.414  | 6.207 | 6.000 | 45           | 33.517                         | 32.469 | 31.422 | 30.375 |
| 21           | 7.299                          | 7.071  | 6.843 | 6.615 | 46           | 35.023                         | 33.928 | 32.834 | 31.740 |
| 22           | 8.011                          | 7.760  | 7.510 | 7.260 | 47           | 36.562                         | 35.419 | 34.277 | 33.134 |
| 23           | 8.756                          | 8.482  | 8.209 | 7.935 | 48           | 38.135                         | 37.020 | 35.745 | 34.560 |
| 24           | 9.534                          | 9.236  | 8.938 | 8.640 | 49           | 39.741                         | 38.499 | 37.257 | 36.015 |
| 25           | 10.345                         | 10.021 | 9.698 | 9.375 | 50           | 41.379                         | 40.086 | 38.793 | 37.500 |

To find the deflection (D) in inches:

$$D = \frac{\text{coefficient}}{\text{depth in inches}}$$

Sections symmetrical about neutral axis, divide the coefficient given in the table corresponding to the given span and fibre stress by twice the distance of extreme fibre stress from neutral axis, noted as X in tables of elements of sections.



## General Erection Information

### ERECTION DRAWINGS—

Erection drawings are supplied with shipment of materials to insure proper placing of the Metal Lumber, each piece of which is cut to length and marked to correspond with erection diagrams.

### SAFE LOAD TABLES—

Safe load tables and properties given herein cover only standard materials in usual spacings. They are based on finished construction, braced by bridging and usual floor construction. Load bearing values for special conditions will be gladly supplied together with details or suggestions. No allowance has been made in the tables for the added strength given to the Metal Lumber by the reinforced concrete slab on the top.

In all calculating of loading tables, a fibre stress of not more than 16,000 lbs. per square inch is used with moment of  $WL/8$  and a deflection of not over  $1/360$ th of span.

### METAL LUMBER SPACING—

Four standard spacings have been approved to accommodate the standard length of metal lath sheets as follows: 12", 16", 19" and 24". The spacing should be determined by the intended use of the floors and allowance made where concentrated loads will be applied as in garages or under heavy safes, stockrooms, etc.

### LENGTH OF SECTIONS—

Metal Lumber sections may be furnished in any desired length subject only to shipping and erection limitations. Long lengths permit some reduction in size since the member can be figured as a continuous beam. Excessive lengths increase costs and erection and transportation difficulties. As a rule it is not economical to use joists or studs much over 25 feet in length. In load bearing members, the sections range from .072 to .120 inches in thickness. Sections from .072 to .090 inches thick are known as Standard sections. Metal Lumber sections measuring .120 inches in thickness are

known as Special and used principally for headers and trimmers where conditions call for greatly increased strength.

### SIMPLIFIED ERECTION—

In Metal Lumber construction, it is understood that sections of the proper weight, size and spacing will be used in conjunction with a concrete slab over metal lath on top of joists and, unless otherwise specified, a plaster ceiling on metal lath directly beneath joists. For this slab reinforcement, a metal lath such as RIBPLEX or equal should be used, securely fastened to the Metal Lumber at 4 inch intervals and with the ribs running at right angles to the metal joists. The metal lath must have a lap of at least two inches if the lap comes over a metal joist, otherwise a lap of 8 inches is required with both ends of the lath securely wired. The installation of this type of floor consists of eight simple operations after the wall or beam bearings have been made ready.

- (1) Installing the light weight, easily handled Metal Lumber joists on predetermined centers.
- (2) Lacing and nailing 1 inch 20 gauge galvanized flat or 14 gauge galvanized wire bridging.
- (3) Securely fastening sheets of metal lath to the top of the joists.
- (4) Securing 2 inch by 2 inch wooden screeds to the top of the joists when a finished wood floor is required.
- (5) Pouring a two inch concrete slab.
- (6) Installing the floor finish.
- (7) Securing the ceiling metal lath.
- (8) Plastering the ceiling on the metal lath base.

The simple routine of the work, the ease of inspection, the speed and economy of erection with the uncertainty of labor and weather conditions removed is responsible for the universal preference of Metal Lumber Construction.



## Details of Design and Construction

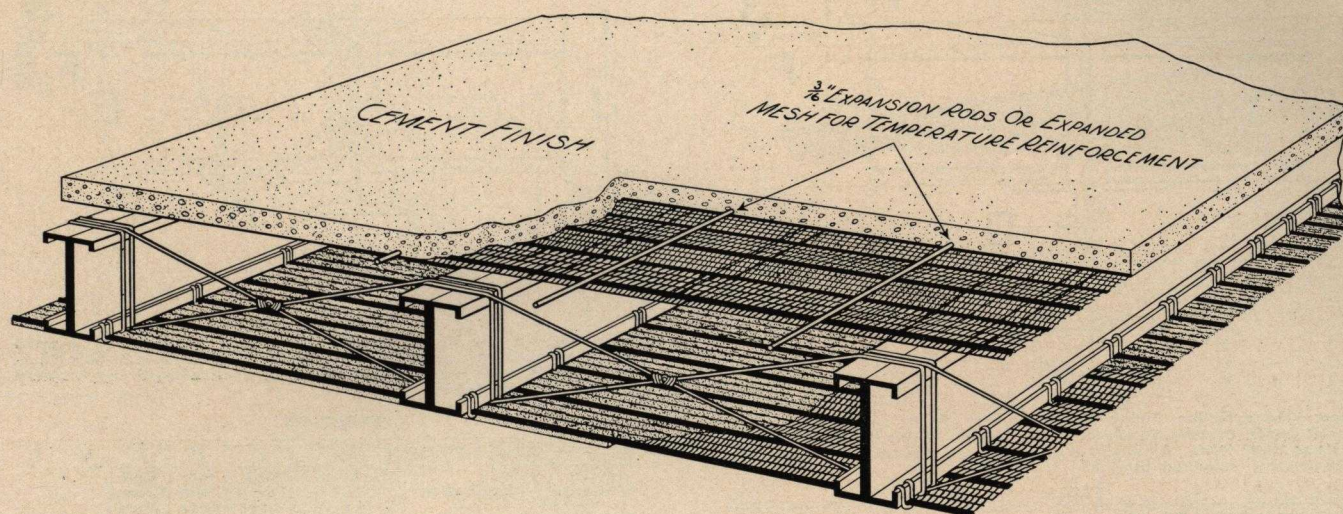


Figure 2

The illustration above shows the concrete slab, floor finish and the plastered ceiling beneath. Note the perfect coordination of all materials in this type of construction.

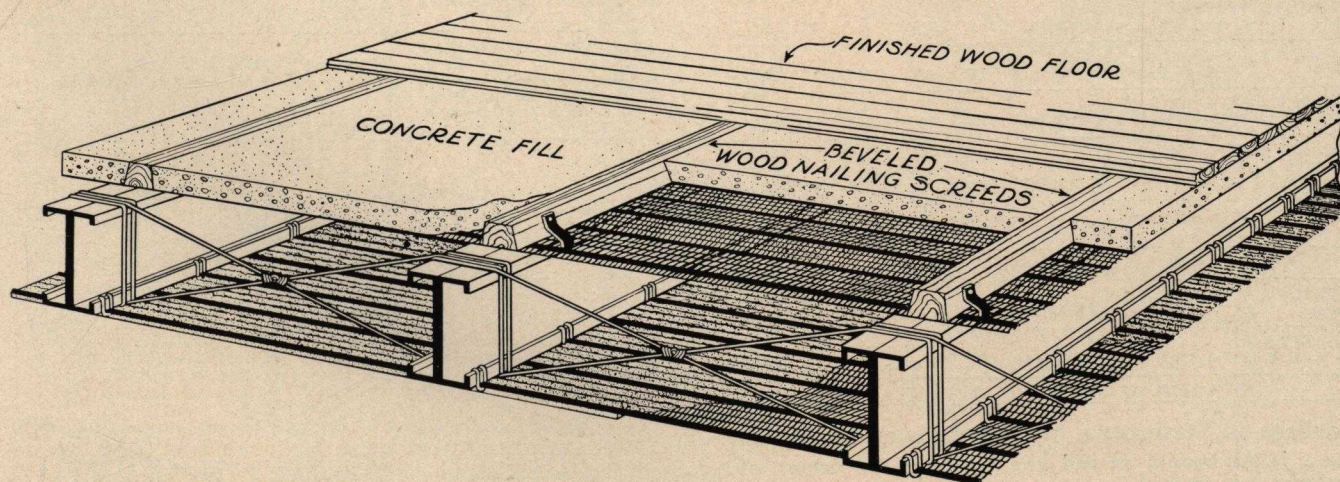


Figure 3

This illustration shows the wood nailing screeds used when a finished floor is required.  $\frac{3}{8}$ " Ribplex Metal Lath assures perfect key for the slab above and the ceiling below.



# Details of Design and Construction

## Joist Clearance Tables

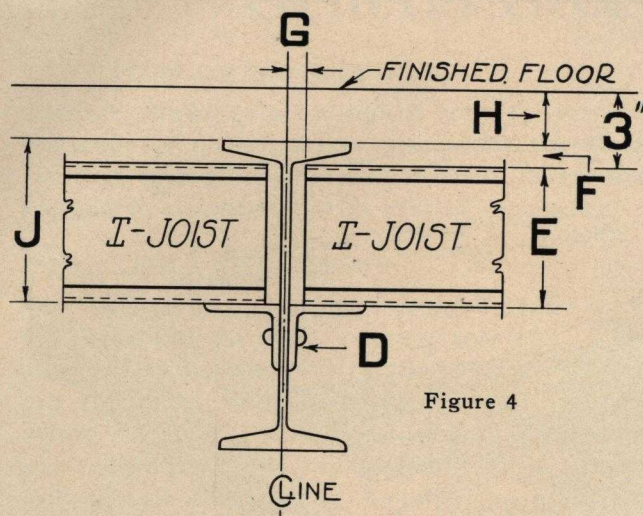


Figure 4

Proper clearances for Berloy Metal Lumber Joists supported on top of shelf angles, between structural steel I Beams. Table based on 3" floor thickness above joists. All angles must have long leg outstanding to support joists with 2 1/2" minimum bearing.

TABLE "A"

| SIZE OF STEEL I BEAM       |                                         | D                      | E                  | F             | G             | H      | J       |
|----------------------------|-----------------------------------------|------------------------|--------------------|---------------|---------------|--------|---------|
| Standard                   | Bethlehem                               | Size of Angle          | Max. Size of Joist | Top Clearance | End Clearance |        |         |
| 8"-I@18.4 #<br>20.5 #      | 8"-I@17.5 #<br>19.5 #                   | 3" x 2 1/2" x 1/4"     | 4"                 | 3/4"          | 3/4"          | 2 1/4" | 4 3/4"  |
| 9"-I@21.8 #<br>25 #        | 9"-I@20 #<br>-24 #                      | 3" x 2 1/2" x 1/4"     | 5"                 | 3/4"          | 3/4"          | 2 1/4" | 5 3/4"  |
| 10"-I@25.4 #<br>30 #       | 10"-I@23.5 #<br>28.5 #                  | 3" x 2 1/2" x 1/4"     | 6"                 | 3/4"          | 3/4"          | 2 1/4" | 6 3/4"  |
| 12"-I@31.8 #<br>35 #       | 12"-I@28.5 #<br>32 # -36 #              | 3" x 2 1/2" x 1/4"     | 7"                 | 1"            | 3/4"          | 2"     | 8"      |
| 15"-I@42.9 #<br>45 #       | 15"-I@38 #<br>41 # -46 # -54 #          | 3" x 2 1/2" x 1/4"     | 10"                | 1"            | 3/4"          | 2"     | 11"     |
| 18"-I@54.7 #<br>60 #       | 18"-I@48.5 #<br>52 # -54 # -59 #        | 3" x 2 1/2" x 1/4"     | 12"                | 1 1/8"        | 3/4"          | 1 1/8" | 13"     |
| 20"-I@65.4 #<br>70 # -75 # | 20"-I@59 #<br>64 # -69 # -72 #<br>-82 # | 3 1/2" x 2 1/2" x 1/4" | 12"                | 1 1/8"        | 7/8"          | 1 1/8" | 13 1/8" |
|                            | 24"-I@73 #<br>83 #                      | 3" x 2 1/2" x 1/4"     | 12"                | 1 1/8"        | 3/4"          | 1 1/8" | 13 1/8" |
|                            | 26"-I@90 #                              | 3 1/2" x 2 1/2" x 1/4" | 12"                | 1 1/4"        | 3/4"          | 1 3/4" | 13 1/8" |
| 20"-I@81.4 #<br>(Spec.)    |                                         | 3 1/2" x 2 1/2" x 1/4" | 12"                | 1 1/4"        | 7/8"          | 1 3/4" | 13 1/4" |
| 24"-I@79.9 #<br>85 # -90 # | 28"-I@105 #                             | 3 1/2" x 2 1/2" x 1/4" | 12"                | 1 1/4"        | 7/8"          | 1 3/4" | 13 1/4" |
|                            | 30"-I@120 #                             | 3 1/2" x 2 1/2" x 1/4" | 12"                | 1 3/8"        | 7/8"          | 1 5/8" | 13 5/8" |

### Bearings on Structural Steel Beams or Channels

Single joists should extend slightly over the center of the beam or channel.

Lapp joists should also be placed well over center of beam. Butt joists should not be used unless the flange of structural section is at least 5 1/2 inches and a clearance of at least one-half inch should be allowed between ends of joists.

Attachment of joist to beam is made by the use of beam clip as shown in Figure 6.

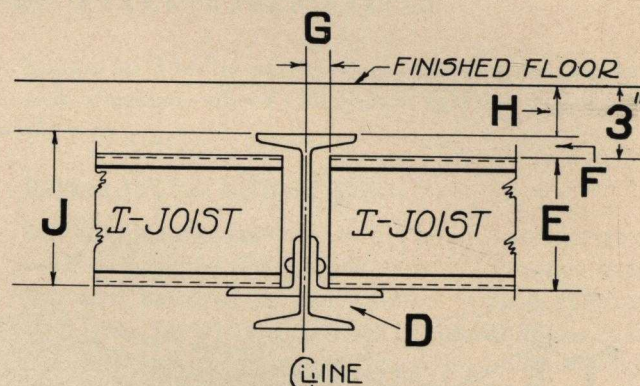


Figure 5

Proper clearances for Berloy Metal Lumber Joists supported on inverted shelf angles, between structural steel I Beams. Table based on 3" floor thickness above joists. All angles must have long leg outstanding to support joists with 2 1/2" minimum bearing.

TABLE "B"

| SIZE OF STEEL I BEAM                |                                        | D                      | E                  | F             | G             | H      | J       |
|-------------------------------------|----------------------------------------|------------------------|--------------------|---------------|---------------|--------|---------|
| Standard                            | Bethlehem                              | Size of Angle          | Max. Size of Joist | Top Clearance | End Clearance |        |         |
| 6"-I@12.5 #<br>14.75 # -<br>17.25 # |                                        | 3 1/2" x 2 1/2" x 1/4" | 4"                 | 5/8"          | 1"            | 2 3/8" | 4 5/8"  |
| 7"-I@15.3 #<br>17.5 # -20 #         |                                        | 3 1/2" x 2 1/2" x 1/4" | 5"                 | 5/8"          | 1"            | 2 3/8" | 5 5/8"  |
| 8"-I@18.4 #<br>20.5 #               | 8"-I@17.5 #<br>19.5 #                  | 3 1/2" x 2 1/2" x 1/4" | 6"                 | 3/4"          | 1 1/8"        | 2 1/4" | 6 3/4"  |
| 9"-I@21.8 #<br>25 #                 | 9"-I@20 #<br>-24 #                     | 3 1/2" x 2 1/2" x 1/4" | 7"                 | 3/4"          | 1 1/8"        | 2 1/4" | 7 3/4"  |
| 10"-I@25.4 #<br>30 #                | 10"-I@23.5 #<br>28.5 #                 | 3 1/2" x 2 1/2" x 1/4" | 8"                 | 3/4"          | 1 1/8"        | 2 1/4" | 8 3/4"  |
| 12"-I@31.8 #<br>35 #                | 12"-I@28.5 #<br>32 # -36 #             | 3 1/2" x 2 1/2" x 1/4" | 10"                | 3/4"          | 1 1/8"        | 2 1/4" | 10 3/4" |
| 15"-I@42.9 #<br>45 # -50 #<br>55 #  | 15"-I@38 #<br>41 # -46 #<br>54 # -64 # | 3 1/2" x 2 1/2" x 1/4" | 12"                | 1"            | 1 1/8"        | 2"     | 13"     |

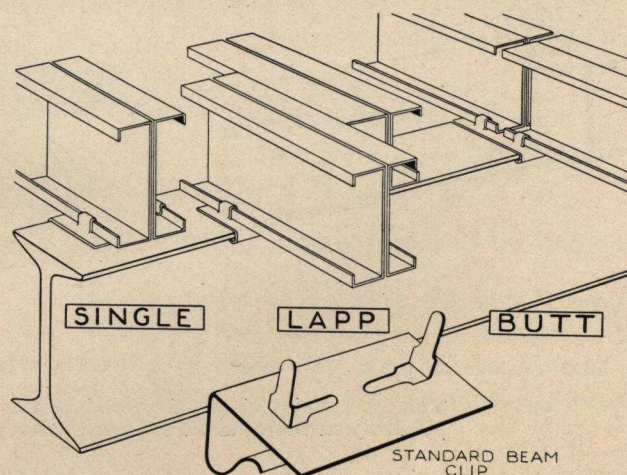


Figure 6



## Details of Design and Construction

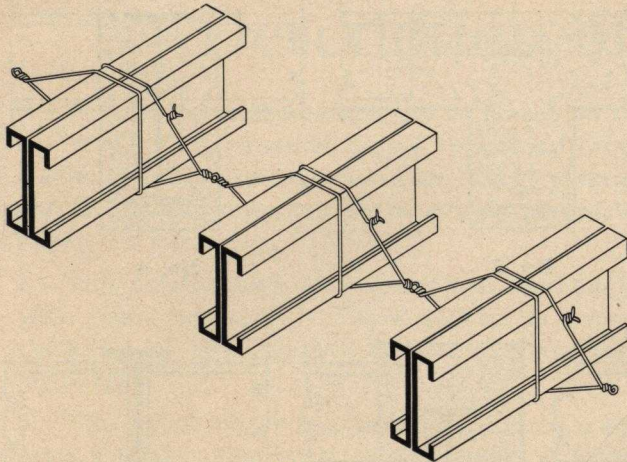


Figure 7

14 gauge galvanized wire is used in a figure 8 around joists and then tensioned by twisting after joists are properly spaced.

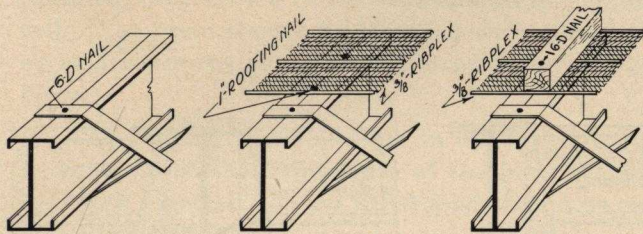


Figure 8

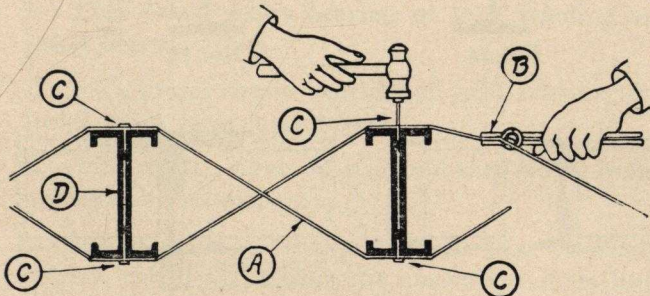


Figure 9

### Bridging

- (A) 1"-20 Gauge Galvanized Flat Bridging.
- (B) Flat-nosed pincher used to pull Bridging taut.
- (C) 6d nail for nailing Bridging into webs of I-Joists.
- (D) Metal I-Joists.

Flat bridging as shown in Figs. 8 and 9 should be used to tie the joists together, hold joists in a vertical position and help to transfer concentrated loads to adjacent joists. Bridging should be placed in such a way that there is never more than six feet between the rows. Bridging should be installed as soon as possible after joists are placed. It is drawn taut and nailed only at tops of joists at first. Then when scaffolding for plastering has been erected the bridging may be pulled sidewise beneath the joists to take up any slack and nailed to the bottom of the joist.

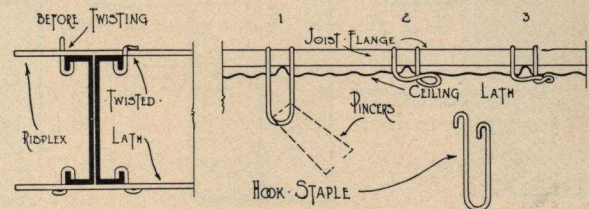
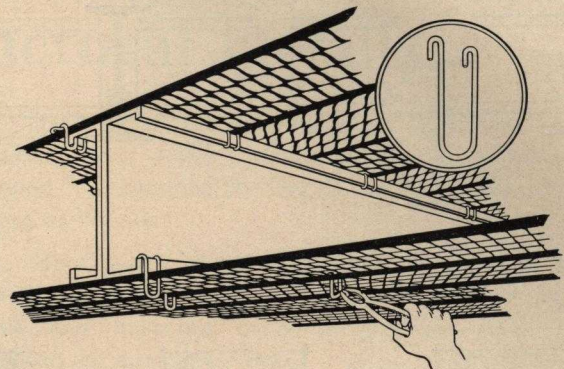


Figure 10

The use of the hook staple or No. 6 Wire Lath Clip shown in the successive operations above assures a positive connection between floor or ceiling lath and Metal Lumber.

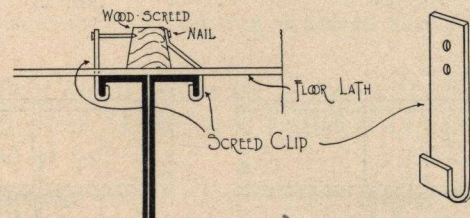
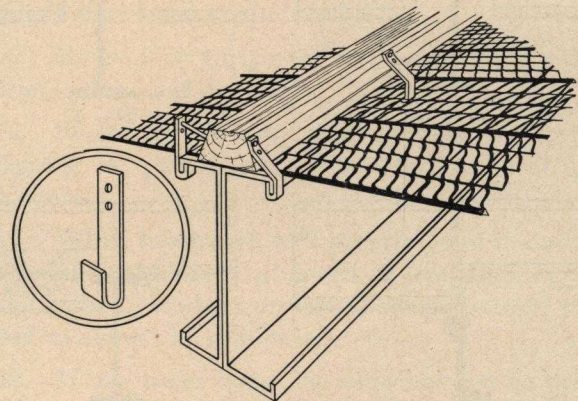
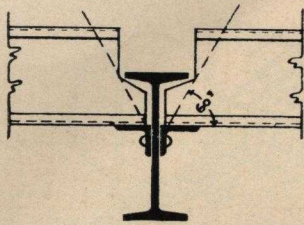


Figure 11

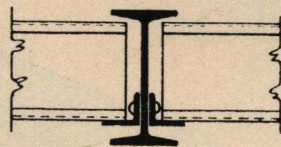
By the use of this screed clip, the wood screed is securely fastened to the joist and easily leveled by means of wedges without loosening the connection.



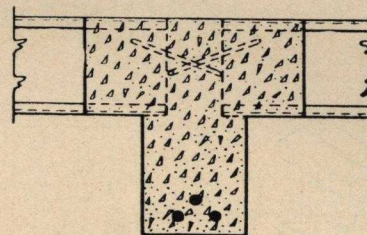
# Details of Design and Construction



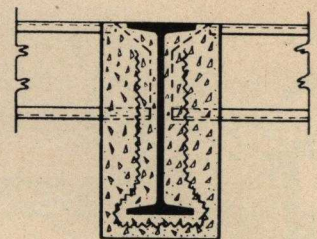
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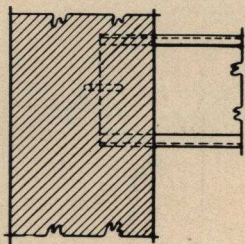
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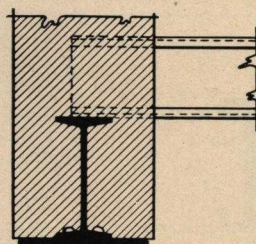
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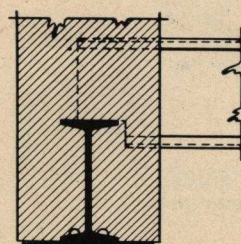
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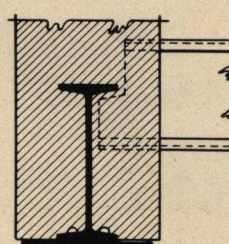
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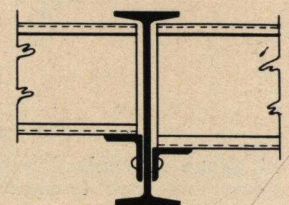
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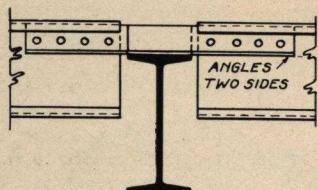
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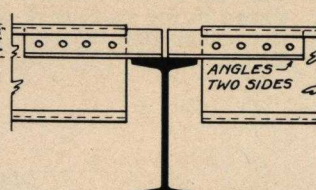
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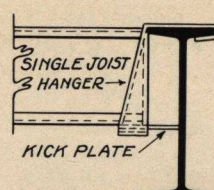
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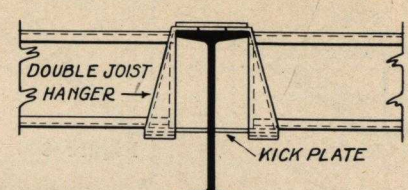
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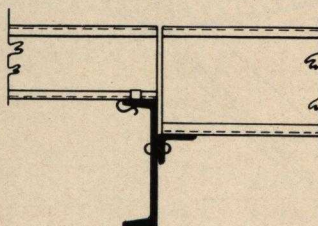
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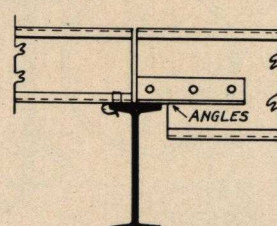
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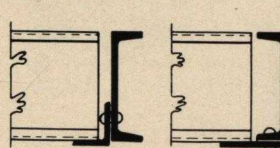
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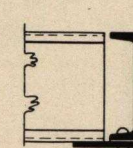
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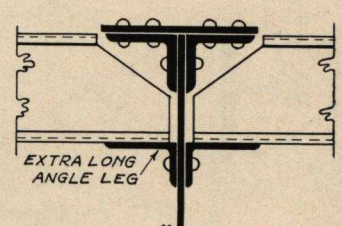
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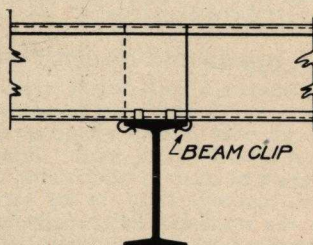
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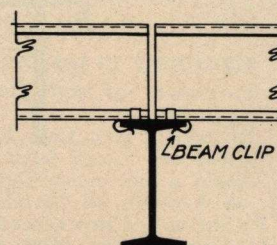
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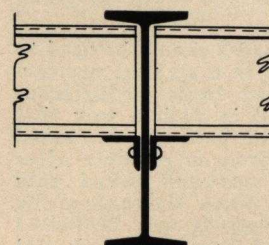
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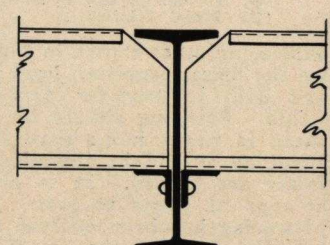
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No. 20



No. 21



No. 22

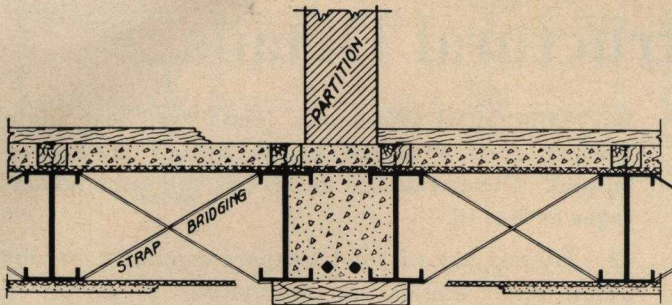


## Description of Structural Details

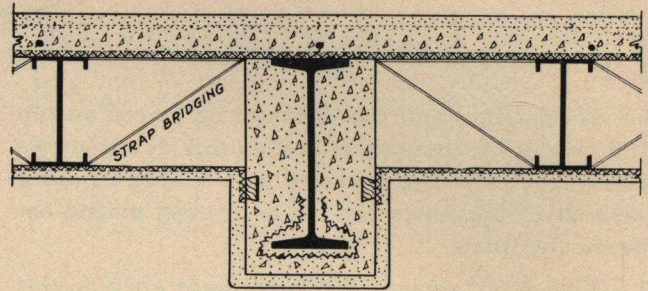
1. When pipes and conduits can be placed on top and parallel to structural beams, this detail shows clearance below the concrete slab. Those running parallel to the joists can be, of course, placed between the joists.
2. This detail shows joists bearing on shelf angles with joists not coped. There will be an uneven thickness of the concrete slab at the structural member.
3. This detail shows framing of joists into a concrete T beam. The joists should extend at least 2 inches into the stem of the beam.
4. When joists bear directly on the concrete fireproofing, they should be coped as shown in this detail. The beam should be wrapped with steel lath or reinforcement to secure the fireproofing to the beam.
5. The bearing of steel joists in masonry should be equal to one-half the depth of the joist but not less than 4 inches. Every third joist should be anchored as shown.
6. This detail shows bearing of joist framing on lintel beams.
7. This detail shows bearing of joist framing on lintel beam with joist coped.
8. This detail shows joist coped into lintel beam and bearing on masonry.
9. When joists of unequal depth bear on shelf angles, this detail shows the method of installing the shelf angles.
10. This detail shows joists with seat angle bearing ends. Shelf angles are eliminated, greatly reducing cost. An even thickness of slab can be applied, eliminating cracks in the finished floor. Pipes and conduits can be laid in the space between the ends of the joists and the web of the structural member or run over the top of the joists as required. The seat angles are lapped in this detail.
11. This detail also shows joists with seat angle bearing ends with the angles butted instead of lapped. Otherwise the detail has the same advantages as No. 10.
12. By the use of joist hangers as shown in this detail, shelf angles are eliminated. A saving in time and erection costs is possible with this method of joist bearing.
13. This detail shows a double joist hanger. Note that joists are not coped and that there is ample room for pipes and conduits in space between back of hanger and web of structural member.
14. Joists of unequal depth are shown in this detail framing on channel section.
15. This detail shows two unequal joists framing on top of I beam. The deeper joist is coped and furnished with seat angle as shown.
16. When joists must be framed on channel sections, as around stairwells and other openings, this detail shows use of shelf angle.
17. Shows joist supported on a bearing plate when framing around openings.
18. Shows extra long shelf angles and proper coping of joists around heavy structural steel girders.
19. When headroom will permit there is no more efficient or economical detail of joist bearing than the lapped members on top of the structural member as shown in this detail.
20. If the beam flange is wide enough to permit butting of joists on the structural beam similar economies and efficiencies as stated above are possible.
21. This detail is similar to detail No. 2, except that the legs of the shelf angles are turned down instead of up.
22. Shows joists coped and bearing on shelf angles.



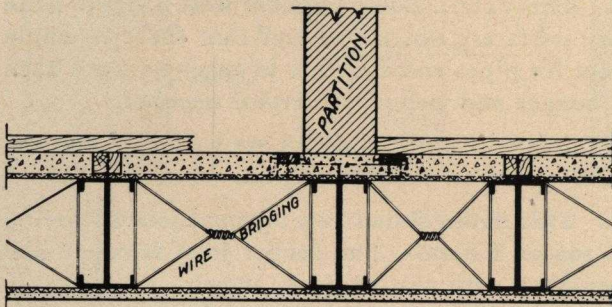
# Details of Design and Construction



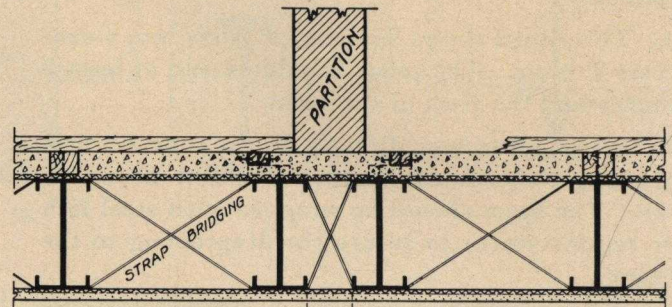
No. 1



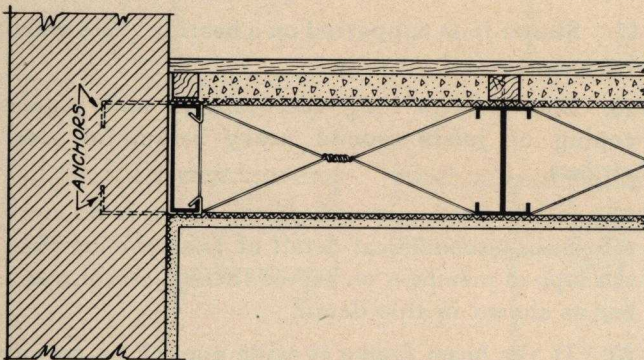
No. 2



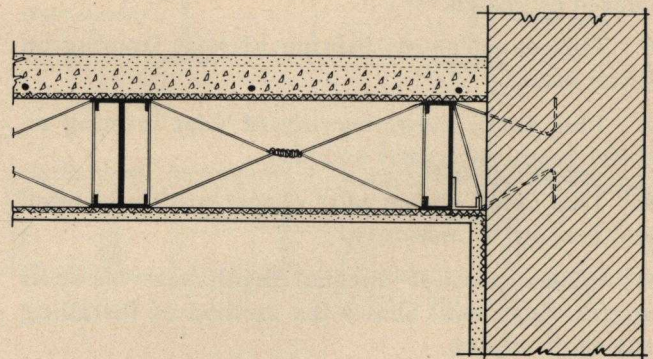
No. 3



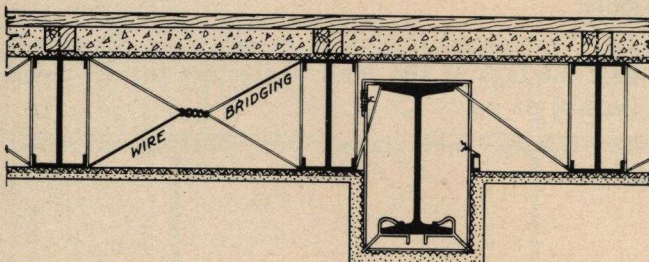
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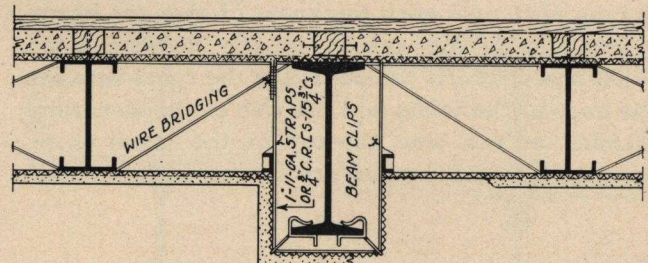
No. 5



No. 6



No. 7



No. 8



## Description of Structural Details

1. When partitions are too heavy for standard steel joist construction and run parallel to the joist, a reinforced concrete beam can be poured between two joists as shown in this detail. It is necessary to complete the concrete form by suspending a plank as shown.

2. When the tops of structural tie members are on same level as the tops of the Metal Lumber, the tie members can be utilized as steel joists. Bridging is brought over top of the tie member only. The lower flange of the beam is wrapped with metal lath and the beam is poured, inserting ceiling lath nailing screeds as shown.

3. When a single joist has sufficient strength to carry a light partition, we suggest the placing of a joist directly under the partition without regard to the spacing of adjacent joists on either side. If the floor finish is to be wood, nailing screeds are placed parallel to the partition to secure the floor next to the partition.

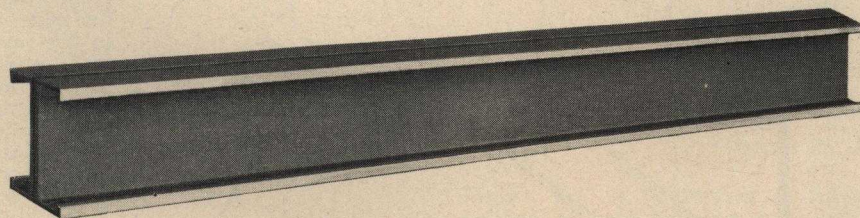
4. When the weight of the partition exceeds the capacity of a single joist and pipes and conduits must run up into the partition, two steel joists are placed as shown with the distance between the two inside flanges sufficient to take the largest pipe that must pass up in the partition. This space is indicated in the detail as X. Note floor nailing screeds inserted adjacent to partition.

5. When a channel section is used next to a wall, it should be carefully anchored into the wall as shown.

6. This detail is similar to No. 5. It shows the use of a seat angle to give the channel added perpendicular rigidity. It shows also a common method of anchoring.

7. This detail shows a structural steel tie member not in the same horizontal plane as the steel joists. When this condition occurs, the tie member is not used or considered as a steel joist, as described in detail No. 2. The steel joists are spaced as near as possible in their normal spacing with bridging running over top of the tie member. Beam furring clips are used on the bottom flange of structural member and diamond mesh lath attached to one inch, 11 gauge straps or  $\frac{3}{4}$ " cold rolled channels are framed around structural beam as shown.

8. This detail is similar to No. 2 in which the tie member is used as a steel joist. The wood floor nailing screed is anchored in the concrete fill by driving 10d nails into the sides as shown. Beam furring clips and the 1" 11 gauge straps or channels are used as in detail No. 7. Three-quarter inch channels are secured parallel to the tie member to give rigidity at the point where the ceiling intersects the beam.



*The Greatest Economy in Modern Building*



# Details of Design and Construction

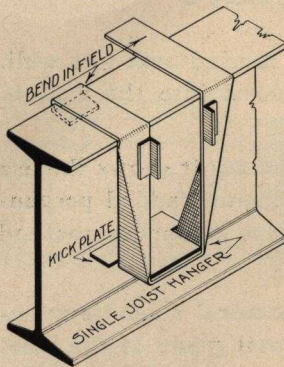


Figure 12

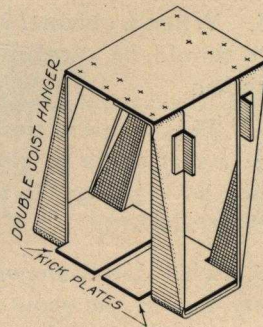


Figure 13

## Berloy Joist Hangers

These hangers are sometimes used in place of shelf angles to support Metal Lumber joists on structural steel beams and channels. They are of heavy gauge material and afford support to sides of top flanges of joists which makes temporary wood strips unnecessary; but bridging should be installed promptly. Hangers are placed and properly spaced before joists are installed.

In ordering hangers it is necessary to give width of beam flange and width and depth of Metal Lumber section. If joists do not meet beam at right angles the angle should also be given. Fig. 12 shows type of hanger where joists occur only on one side of beam. Fig. 13 shows hanger used where joists are to be supported on both sides of beam.

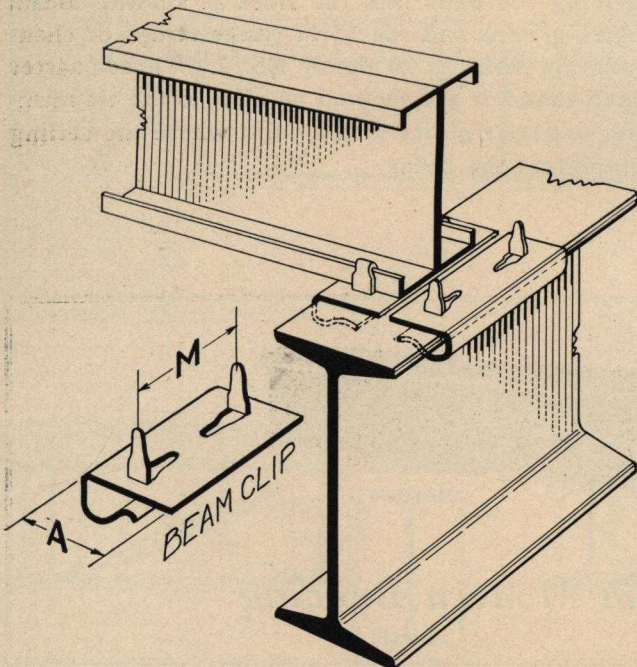


Figure 14  
Berloy Pronged Beam Clip

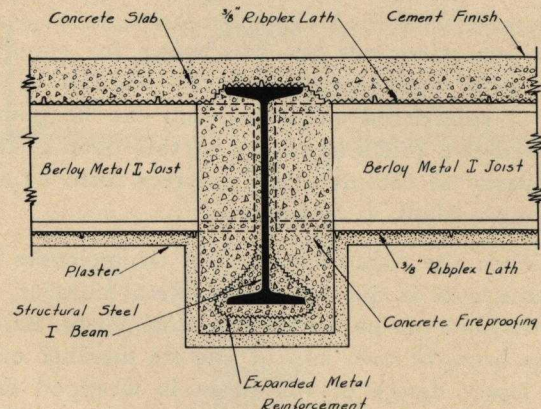


Figure 15

## Solid Concrete Beam Protection

Method of Fireproofing Structural Steel Beams with concrete.

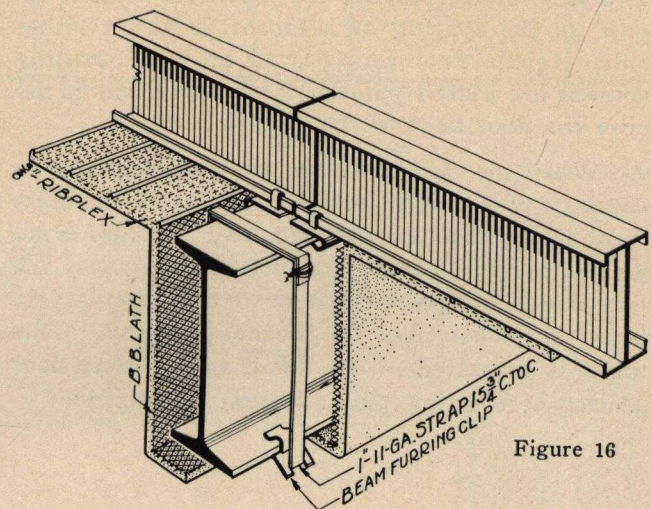


Figure 16

Beams or portions of beams projecting below the ceiling line must be protected from fire in fire-resistive construction.

Standard Berloy beam protection in connection with metal lumber floor construction is shown above. This construction is economical and effective. Furring clips and straps or channels are spaced

15 3/4 inches on centers for diamond mesh lath and 24 inches on centers for 3/8-inch Ribplex. The lath or Ribplex is securely wired to the straps and plaster is applied of composition to afford protection for the period of time for which the building is rated.



## Details of Floor Construction

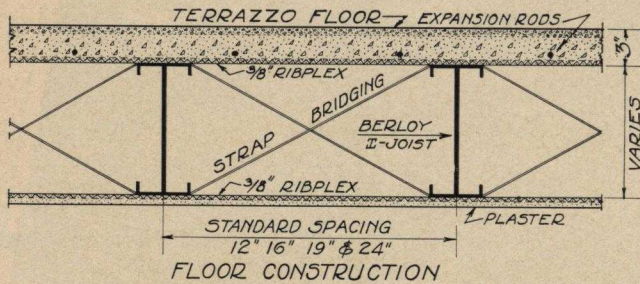


Figure 17

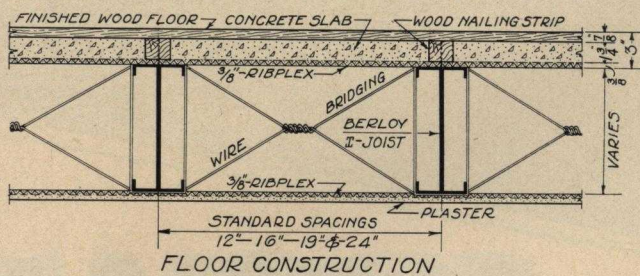


Figure 18

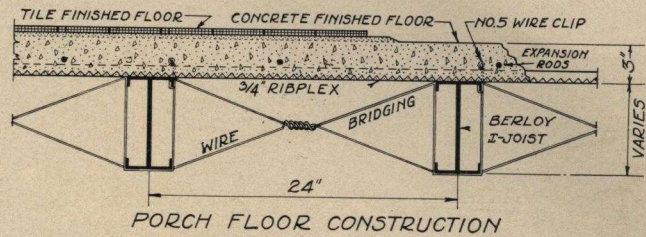


Figure 19

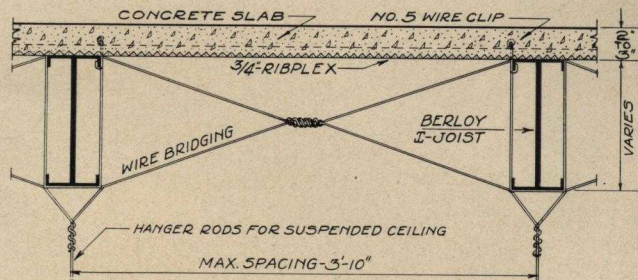


Figure 20

## Framing Around Openings

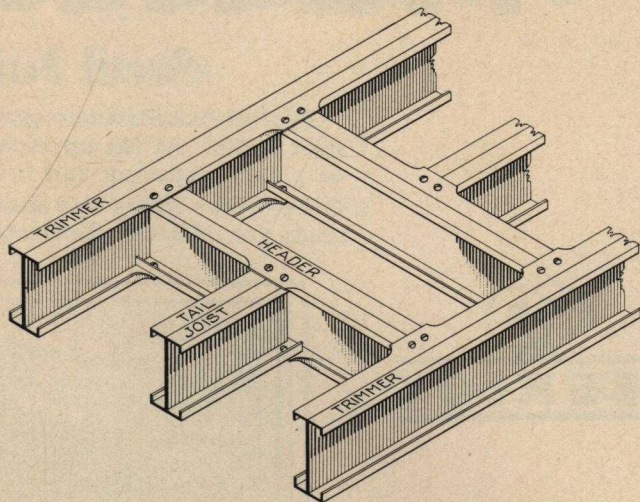


Figure 21

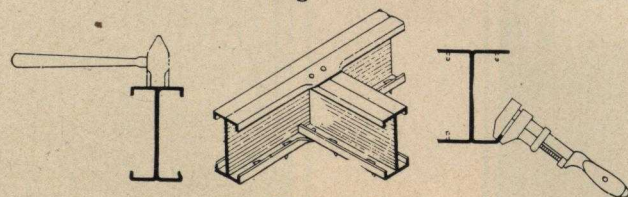


Figure 22

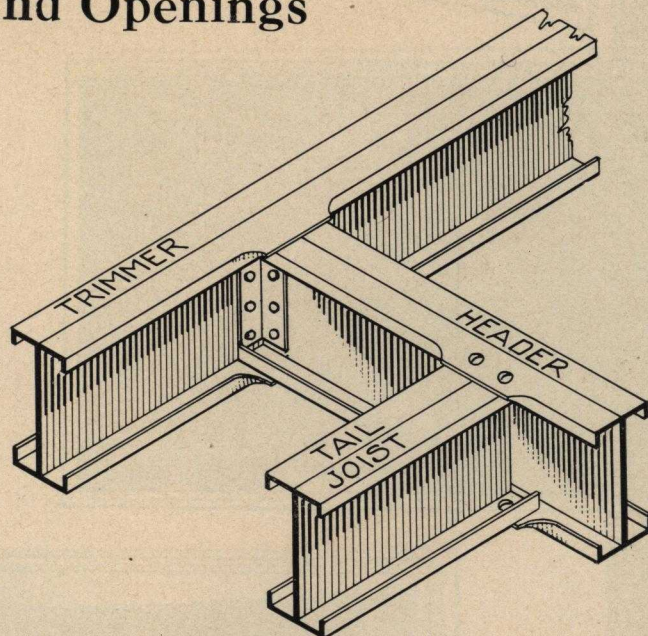
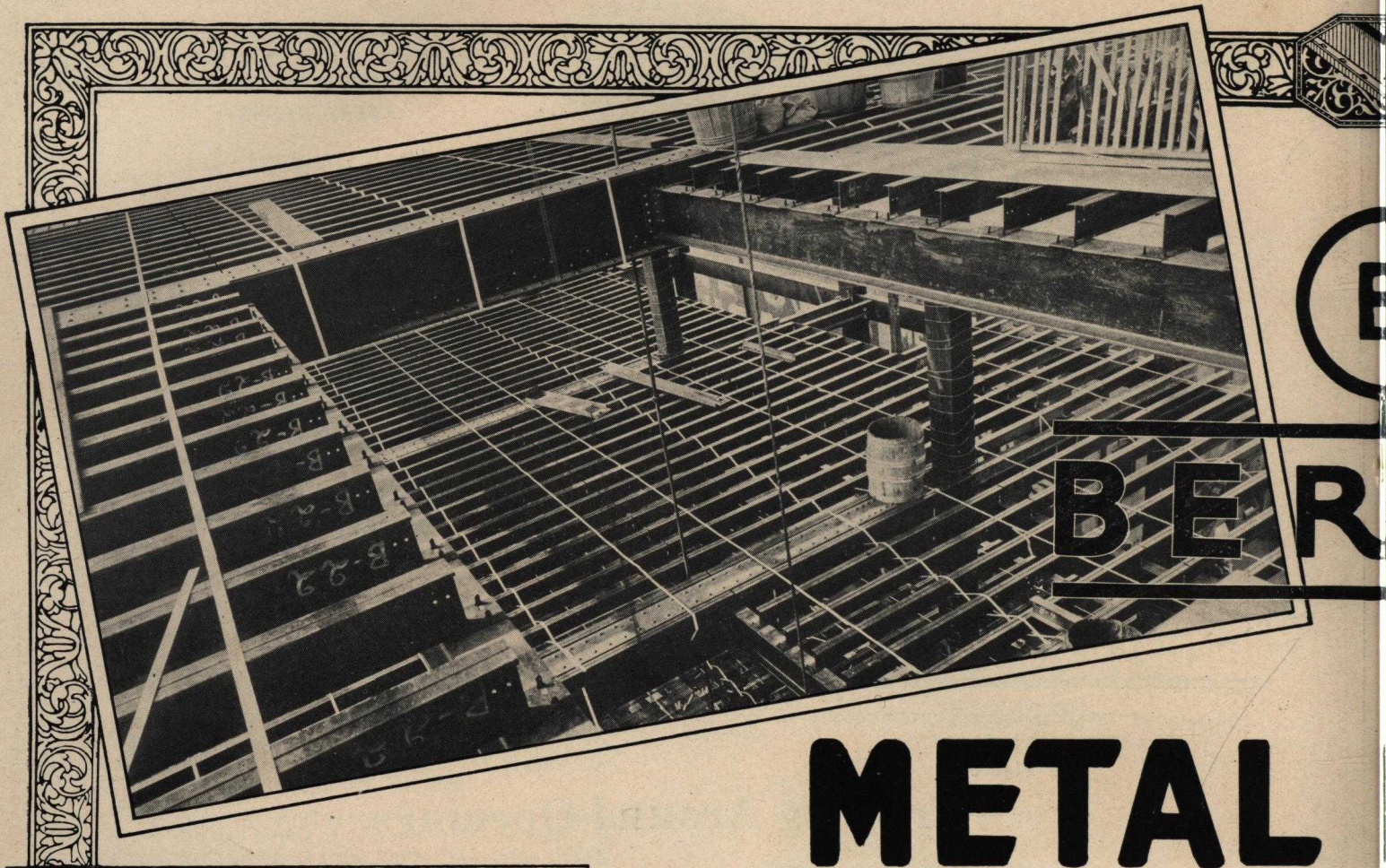


Figure 23

It is our practice to punch holes in the .120 inch thickness sections in the shop before shipment. Punching of lighter materials to be field work as this can readily be accomplished with hand punches.

Figure No. 21 illustrates an effective and economical method of field framing with standard sections around small openings. The vertical projections of the top and bottom flanges of the headers or trimmers are bent out flat at the point of connection, using a wrench and hammer. The ends of the inserted joists are slightly reduced in depth by hammering top and bottom with a heavy hammer. These connections are made with  $\frac{5}{16}$ -inch cold-driven rivets, or bolts.





**B E R**

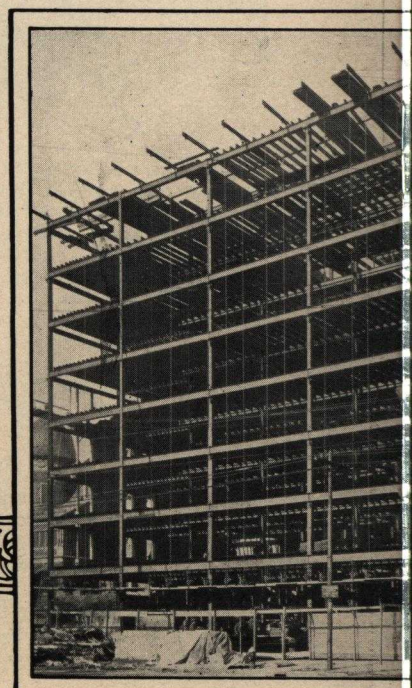
# METAL

## Steel Joists and

Typical installation views showing steel joists. At the upper left and right of placing, spacing and bridging. Other views to the left show roof construction ready for plaster. Lower right shows



**B**  
**BERLOY**





(B)

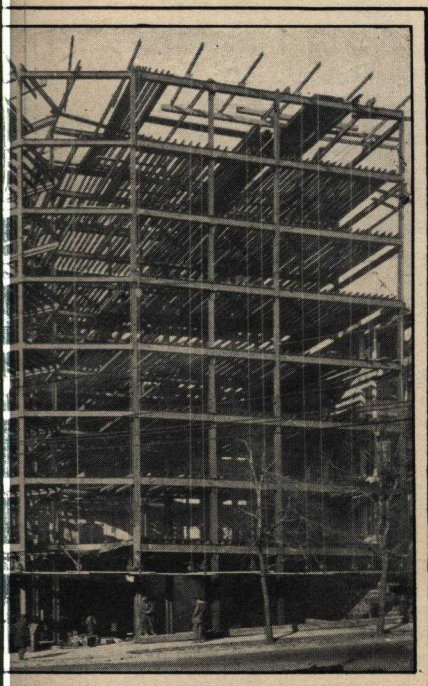
LOY

# LUMBER

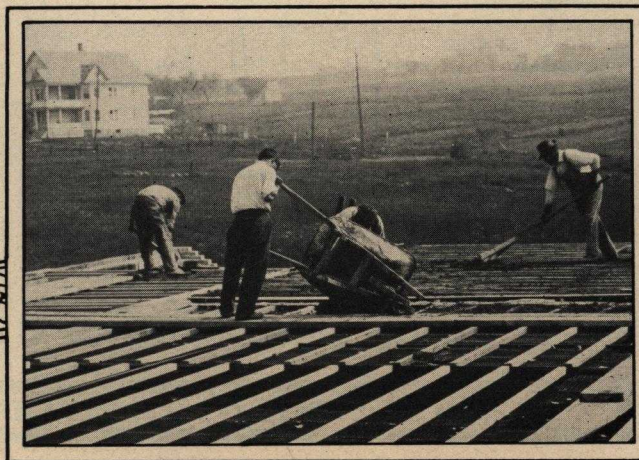
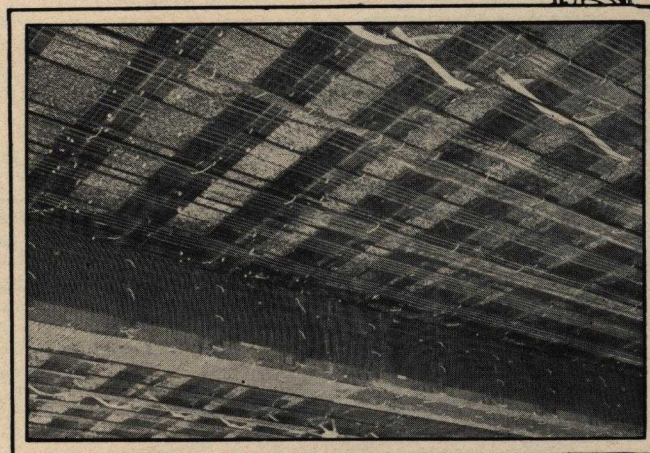
## and Steel Studs

preliminary steps in the installation of  
light, the joists are in the various stages

struction. Center right shows ceiling  
pouring concrete slab.



(B)  
**BERLOY**





## Details of Floor Construction

### Pipes and Conduits

Where possible, piping and conduits should be installed in a direction parallel to and between the joists, or they can be installed over the joists, and the nailing strips (if used) notched, and the concrete fill poured around the conduits or pipes.

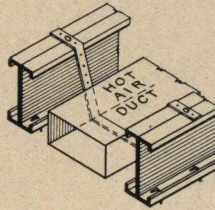


Figure 24

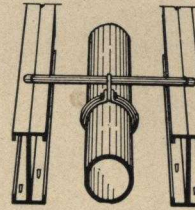


Figure 25

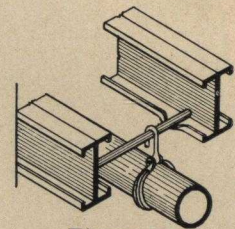


Figure 26

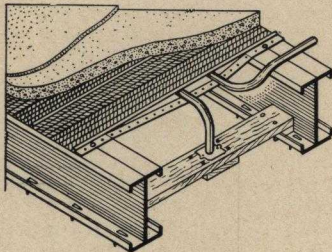


Figure 27

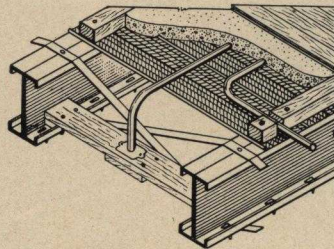


Figure 28

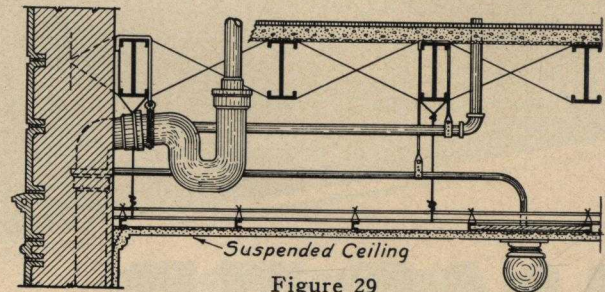


Figure 29

### Risers and seat platforms for Balconies and Grand Stands

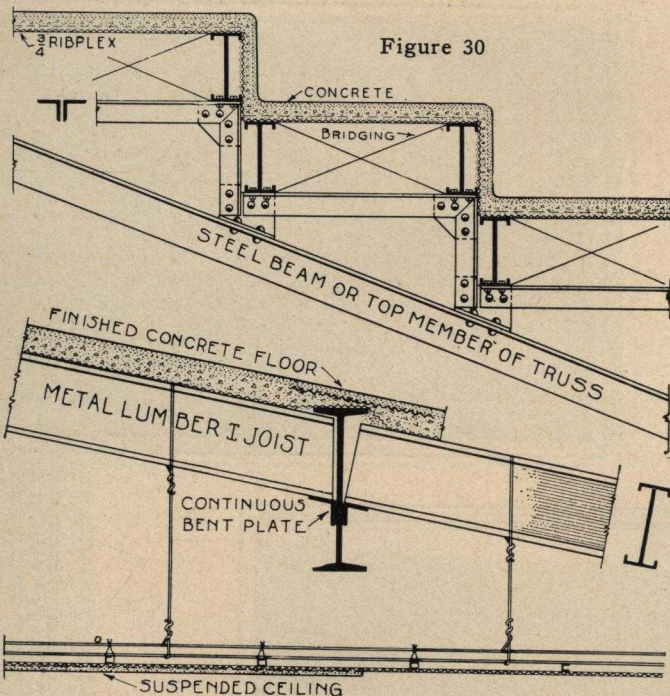


Figure 31

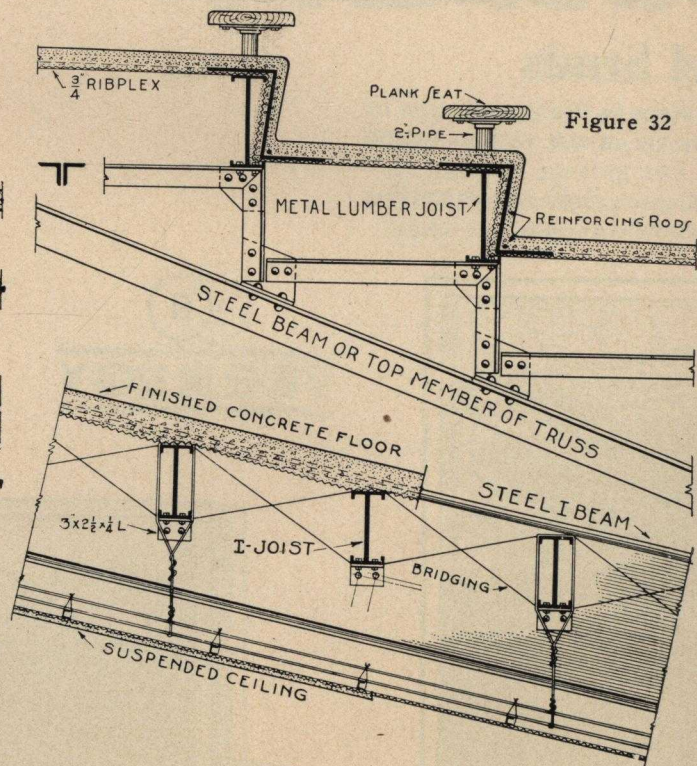


Figure 33

Inclined floors of auditoriums, balconies and ramps, also for sloping roof construction



# Specifications

## GENERAL—

Where pressed steel construction is called for on plans and specifications, it means material equal to Berloy Metal Lumber manufactured by The Berger Manufacturing Company of Canton, Ohio.

## CHEMICAL PROPERTIES—

The steel used in the manufacture of pressed steel joists and studs shall not contain more than .04% of phosphorus or sulphur, .35% to .50% manganese, and must show on chemical analysis .08% to .16% carbon.

Thickness of steel used in joists and studs in supporting partitions shall in no case be less than .072 inches and the lath not less than No. 28 U. S. Standard Ga. All steel entering into the manufacture of joists must show an ultimate tensile strength of not less than 55,000 to 65,000 lbs. per square inch of section; a percentage of elongation equal to 1,400,000 divided by the ultimate tensile strength.

Full facilities must be provided for inspector to make, or have made, such physical or chemical tests as in his judgment are necessary to determine the quality of material used as specified above.

All pressed steel furnished for floors and supporting partitions must be accompanied by erection drawings showing the location, size and character of the members to be used, the drawings to be submitted to the architect for approval before the material is fabricated.

All Metal Lumber pressed steel sections to be hand dipped in a special rust-resisting paint after forming and before shipment. All expanded metal lath to be given one coat of special preservative paint.

## FLOORS—

Floors to be constructed of size and weight of pressed steel I-joists as shown on drawings, spaced as indicated, and bridged laterally at not over 6'-0" centers with 1 inch No. 20 gauge galvanized strap or No. 14 gauge galvanized wire bridging. Strap bridging to be secured by 6d nails driven into the webs of the joists. On top of joists after bridging has been applied, attach Berloy Ribplex or Berloy Diamond Mesh Metal Lath, securing same by large head nails driven directly into web of joists or No. 6 wire lath clips. Ceiling lath to be applied to the bottom flange by means of prongs provided for the purpose, or wired through holes punched in the flanges of the joists or No. 6 wire lath clips. Directly on top of joists and parallel thereto apply 1¾ by 1¾-inch wood nailing strips, same being secured to joists by nailing directly thereto or by means of screed clips.

## CONCRETE—

Top layer of lath to be covered with 1¾ inches of concrete, consisting of 1 part portland cement, 2½ parts sand and 5 parts broken stone, slag, or clean gravel—the maximum size of which will pass through a ¾-inch ring. This concrete to be applied comparatively dry and directly on top of the lath without forms, same being floated to an even surface. Where floors are used requiring other than wood finished surface, eliminate the nailing strips, and apply 2 inches of concrete slab directly on top of the lath, consisting of 1 part portland cement, 2 parts sand and 4 parts gravel or broken stone. This slab to serve as a base for any finish floor which may be called for under other specifications.

## ROOF CONSTRUCTION—

The roof construction is to be the same as specified for the floors, using the 2-inch concrete slab on top of joists without nailing blocks. This slab to be left comparatively rough in order to thoroughly bond the waterproofing surface, which will be applied under another contract.

## SUSPENDED CEILING—

Suspended ceilings are to be constructed of channels and Ribplex. The channels are suspended from the construction above by means of ½-inch round rods, securely fastened thereto.

Apply Ribplex to the under side of the channels by means of No. 16 gauge wire, bent in a manner that will hold the Ribplex securely.

## SUPPORTING PARTITIONS—

Where partitions are required to support floor loads, same are to consist of channel or H-stud sections of sufficient strength to carry, with a proper safety factor, the load of the floor supported thereby. Studs are to be spaced not over 16 inches to 24 inches, center to center, and secured to channel track and crowning members at floor and ceiling line with ½-inch diameter rivets, or bolts. In no case will other devices be permitted to serve as connections for the pressed steel construction. The Ribplex or lath will be applied to the flanges of studs by the prongs punched thereon, or wired through holes punched in the flanges of the studs.

Where openings occur, such as doors and windows, same will be provided with special I-lintels of the proper size to carry superimposed loads which may come over these openings.

Partitions are to be erected in strict accordance with detailed erection drawings provided by the manufacturer and approved by the architect.

## NON-SUPPORTING HOLLOW CHANNEL STUD PARTITIONS—

Where partitions are shown hollow, with Ribplex or metal lath both sides of studs (the depth of studs being 2 inches or more), same are to consist of size of channels shown on plans, secured to both floor and ceiling by channel socket strips. ¾-inch Ribplex or diamond mesh metal lath is secured to studs by means of prongs punched out for that purpose, the prongs being clinched over the metal lath.

## NON-SUPPORTING SOLID PARTITIONS—

The 2-inch partitions where noted on drawings, are composed of 1-inch No. 18 gauge U-studs, or ¾ or 1-inch 16 gauge channel studs, spaced 13½ inches center to center, secured to both floor and ceilings by means of socket strips. 3.0# B B diamond mesh metal lath is secured to studs on one side only by means of prongs punched out for that purpose if U-studs are used, prongs being clinched over the metal lath, or by wiring if channel studs are used.

## RIBPLEX PARTITIONS—

Berloy ¾-inch Ribplex may be used instead of B B Lath by spacing the studs 23½ inches on centers instead of 13½ inches on centers. In this case the rib side of the Ribplex shall be placed against the studs. Berloy ¾-inch Ribplex may be used without the addition of studs, by erecting with ribs extending from floor to ceiling, in which case the ribs replace the studs. The top and bottom of the sheets shall be secured to the ceiling and floor with special track supplied for the purpose.



# Non-Supporting Partition Construction

## HOLLOW PARTITIONS—

Hollow non-supporting partitions consist of 18 or 20 gauge "B" channel studs, standard widths up to 4 inches, but wider studs are furnished special upon order. Studs of 18 gauge should be used for partitions over 10 feet high. The partition usually rests upon the concrete fill and floors should be designed to support the additional weight. Where the partition runs along the line of the joists double joists should be used beneath the partition. See Fig. 35.

The studs are usually held in place by "B" socket strips. Attachment of lath is made by means of prongs punched out of the studs and plastering proceeds according to standard practice. The partition finishes  $1\frac{1}{2}$ " thicker than the width of the studs. Details of construction about doors, etc., are similar to those described for supporting partitions.

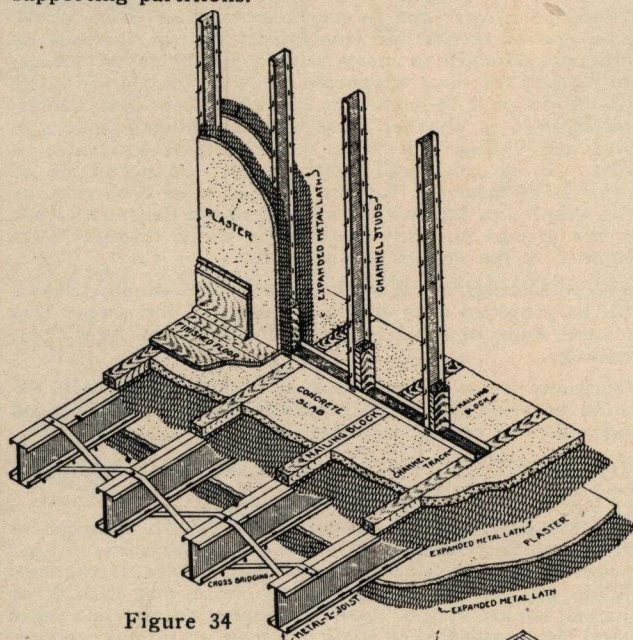


Figure 34

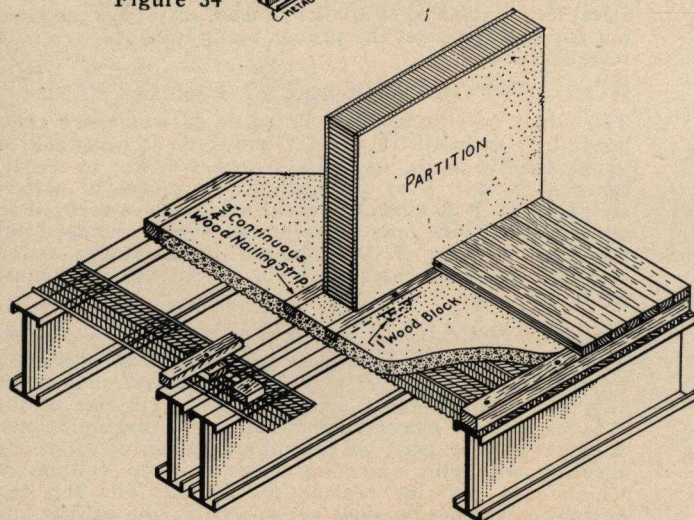


Figure 35

## SOLID PARTITIONS—

The space saving effected by this type of partition which is rigid and sound proof, has led to its extended use, especially in larger buildings. Electrical fixtures manufacturers now make shallow wall boxes and switches especially for this type of partition. Two general methods are used with Berloy materials, the partition in each case finishing about two inches thick.

1. With  $\frac{3}{4}$ -inch Ribplex, ribs vertical, no studs required. Held in place by standard track for  $\frac{3}{4}$ -inch Ribplex or by track of metal lath.
2. With narrow cold-rolled channels or U-Studs held in place by socket strips to which is attached Berloy Metal Lath or  $\frac{3}{8}$ -inch Ribplex with ribs against and at right angles to channels.

Stud Spacing for Ribplex or Diamond Mesh Lath—

For Standard or BB Diamond Mesh Lath, not over 16" on centers.

For  $\frac{3}{8}$ " Ribplex Lath, 19" to 24" on centers.

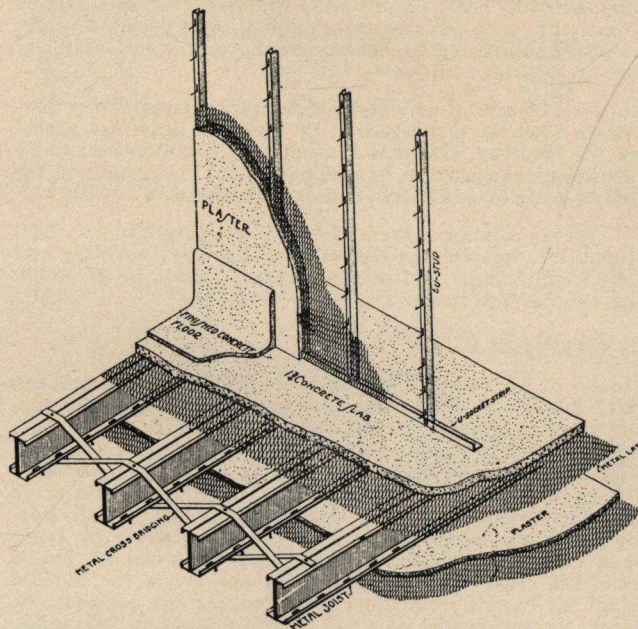


Figure 36

We recommend the following sizes of cold rolled "C" channel studs for solid partition construction:

| Spacing of Studs              | Height in Feet | Size of C Channels |                 |
|-------------------------------|----------------|--------------------|-----------------|
|                               |                | Depth              | Flange          |
| 13 $\frac{1}{2}$ " on centers | 8 to 10        | $\frac{3}{4}$ "    | $\frac{3}{8}$ " |
|                               | 10 to 14       | 1 $\frac{1}{4}$ "  | $\frac{3}{8}$ " |
|                               | 15 to 18       | 1 $\frac{1}{2}$ "  | $\frac{3}{8}$ " |
|                               | over 18        | 1 $\frac{3}{4}$ "  | $\frac{3}{8}$ " |
| 15 $\frac{3}{4}$ " on centers | 8 to 10        | $\frac{3}{4}$ "    | $\frac{3}{8}$ " |
|                               | 10 to 14       | 1 $\frac{1}{4}$ "  | $\frac{3}{8}$ " |
|                               | 15 to 18       | 1 $\frac{1}{2}$ "  | $\frac{3}{8}$ " |
|                               | over 18        | 1 $\frac{3}{4}$ "  | $\frac{3}{8}$ " |
| 23 $\frac{1}{2}$ " on centers | 8 to 10        | $\frac{3}{4}$ "    | $\frac{3}{8}$ " |
|                               | 10 to 14       | 1 $\frac{1}{4}$ "  | $\frac{3}{8}$ " |
|                               | 15 to 18       | 1 $\frac{1}{2}$ "  | $\frac{3}{8}$ " |
|                               | over 18        | 2"                 | $\frac{3}{8}$ " |



STEEL JOISTS

STEEL STUDS

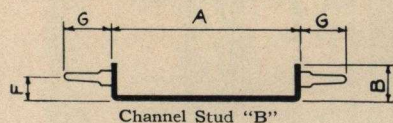
# "B" Sections for Non-Supporting Partitions

Standard Metal Lumber Construction is made up of Joists, Studs, Track, etc., for floors and bearing partitions which are spoken of as "A" Sections.

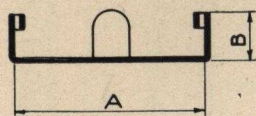
For non-bearing partitions Berloy "B" Sections of much lighter weight than "A" Sections were developed many years ago and widely used under the name "Prong Lock Studs" from the distinctive method used for attaching lath.

The cutting and punching of "B" Sections, which are made of 18 or 20 gauge steel, can easily be handled by the workmen on the job and for this reason "B" material is supplied in standard lengths. All tables and diagrams on this page refer to "B" Sections. In the tables dimensions are given in inches and loads in pounds per foot.

## Dimensions and Weights of Pressed Steel B Channel Studs and Socket Strips

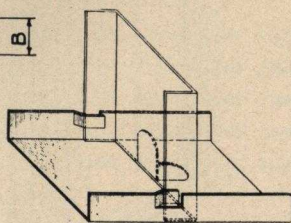


Channel Stud "B"



Socket Strip "B"

Standard punching 13 1/2" on centers. Can be punched for any desired spacing.



Isometric of Strip with Stud in Place

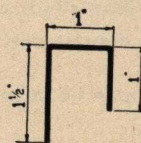
### CHANNEL STUDS "B"

| Wt. | Ga. | A     | B   | F   | G | Wt.  | Ga. | A     | B |
|-----|-----|-------|-----|-----|---|------|-----|-------|---|
| .58 | 18  | 2     | 3/4 | 1/2 | 1 | .67  | 18  | 2     | 1 |
| .44 | 20  |       |     |     |   | .50  | 20  |       |   |
| .67 | 18  | 2 1/2 | 3/4 | 1/2 | 1 | .75  | 18  | 2 1/2 | 1 |
| .50 | 20  |       |     |     |   | .56  | 20  |       |   |
| .75 | 18  | 3     | 3/4 | 1/2 | 1 | .84  | 18  | 3     | 1 |
| .56 | 20  |       |     |     |   | .62  | 20  |       |   |
| .84 | 18  | 3 1/2 | 3/4 | 1/2 | 1 | .92  | 18  | 3 1/2 | 1 |
| .62 | 20  |       |     |     |   | .69  | 20  |       |   |
| .92 | 18  | 4     | 3/4 | 1/2 | 1 | 1.00 | 18  | 4     | 1 |
| .69 | 20  |       |     |     |   | .75  | 20  |       |   |

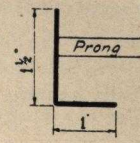
Lengths over 12' 0" long require splices.

### SOCKET STRIPS "B"

## Channel and Angle Track for Use with 3/4-inch Ribplex

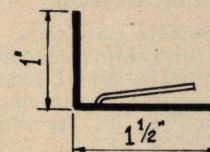
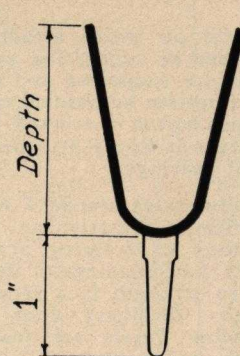


Standard (Ceiling) Channel Track for 3/4" Ribplex Partitions  
Weight, 0.60 lbs.



Standard (Floor) Angle Track for 3/4" Ribplex Partitions  
Weight, 0.420 lbs.

## Dimensions and Weights of Pressed Steel U and Angle Studs and Socket Strips, "B" Material



### SOCKET STRIPS "B" FOR U-STUDS

Furnished in 10-foot lengths unless otherwise specified.

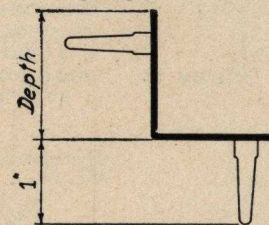
| Size, Ins. | Ga. | Weight per Ft. Black | Weight per Ft. Galv. |
|------------|-----|----------------------|----------------------|
| 1x1 1/2    | 20  | .31                  | .35                  |
| 1x1 1/2    | 18  | .42                  | .45                  |

Socket strips can be furnished plain or punched to any desired uniform spacing.

### U-STUDS "B"

Also used for Ceiling and Wall Furring. Furnished in 10-foot lengths unless otherwise specified. Lengths over 12 feet require splices.

| Depth Ins. | Ga. | Weight per Ft. Black | Weight per Ft. Galv. |
|------------|-----|----------------------|----------------------|
| 3/4        | 20  | .25                  | .28                  |
| 1          | 20  | .31                  | .35                  |
| 1 1/4      | 20  | .38                  | .41                  |
| 1 1/2      | 20  | .44                  | .48                  |
| 1 3/4      | 20  | .50                  | .55                  |
| 2          | 20  | .56                  | .62                  |
| 3/4        | 18  | .33                  | .36                  |
| 1          | 18  | .42                  | .45                  |
| 1 1/4      | 18  | .50                  | .54                  |
| 1 1/2      | 18  | .58                  | .63                  |
| 1 3/4      | 18  | .67                  | .72                  |
| 2          | 18  | .75                  | .81                  |

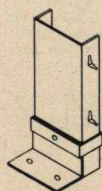


### ANGLE STUDS "B" FOR OUTSIDE CORNERS

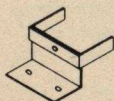
Lengths over 12 feet require splices.

| Size, Ins.  | Ga. | Weight per Ft. Black | Weight per Ft. Galv. |
|-------------|-----|----------------------|----------------------|
| 1 1/4x1 1/4 | 20  | .31                  | .34                  |
| 1 1/2x1 1/2 | 20  | .38                  | .41                  |
| 1 3/4x1 1/4 | 18  | .42                  | .45                  |
| 1 1/2x1 1/2 | 18  | .50                  | .54                  |

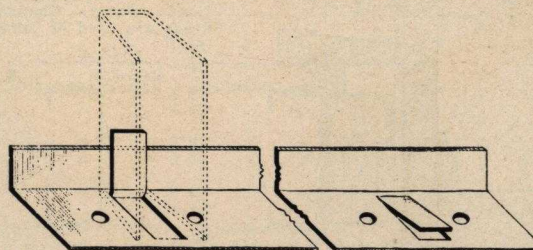
Use same track as for U-studs.



Individual Channel Socket Strips for Curved Partitions  
Made in 18 gauge



Individual U-Stud Socket Strips for Curved Partitions  
Made in 18 gauge  
Weight 100 lbs. per M





# Supporting Partition Construction

Berloy standard supporting partitions are composed of proper size H or channel studs; these can be varied in gauge, spacing and shape to meet the load requirements. Partitions for the lower floors usually consist entirely of H-studs varying in gauge and spacing.

When loads become lighter, channels may be substituted for part of the H-studs.

Channel studs should not be used exclusively in supporting partitions; at least every fourth or fifth stud should be of H section to afford sufficient stiffness to the structure. H studs should be used at the sides of door and window openings.

The partition finishes about 1½ inches thicker than the width of the studs.

Supporting partitions should rest on walls, structural steel or reinforced concrete beams or supporting partitions. The Metal Lumber studs are supported and held in place top and bottom by channel track to which they are bolted or riveted. The track in turn is firmly attached to joists and bearings.

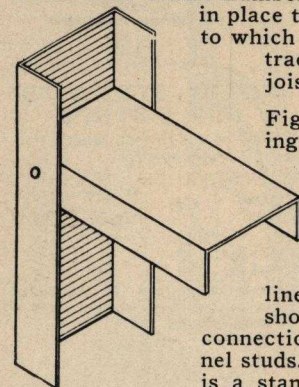


Figure 38

Fig. 40 illustrates standard bearing partition construction and method of framing around wide door openings or where extra strength is a requirement. Ordinary door and window lintels are framed with channel track along lines indicated in Fig. 38. Fig. 39 shows a method of making field connections with standard I and channel studs. Fig. 37 shows the lintel which is a standard section for this class of construction.

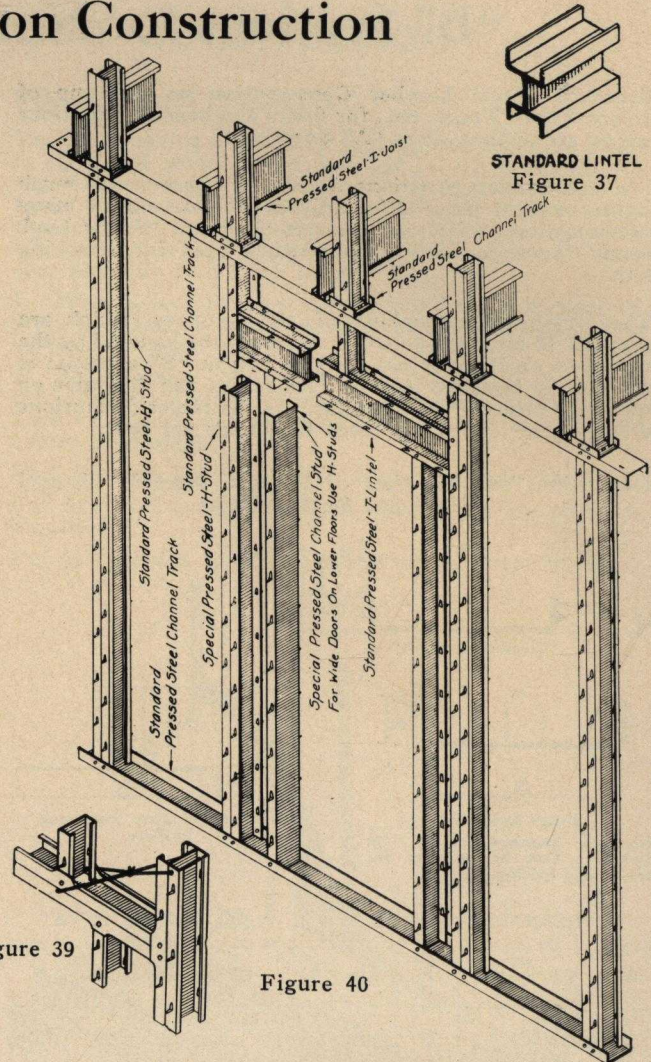


Figure 39

Figure 40

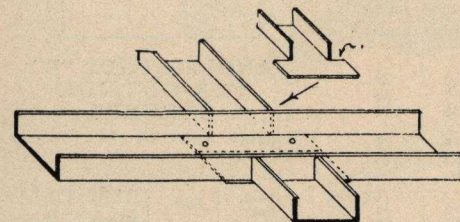


Figure 41

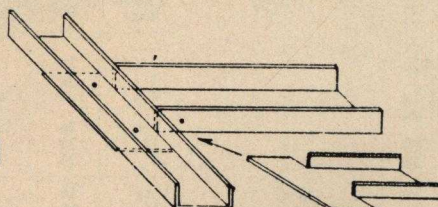


Figure 42

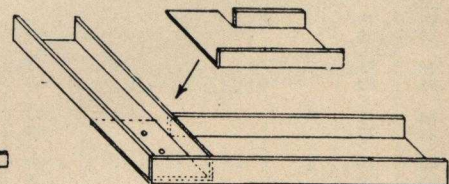


Figure 43

Details showing way to cut track so that one partition may be tied to another. Track at ceiling to be same as at floor.

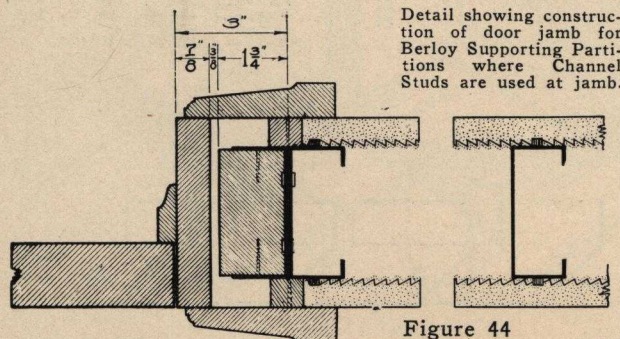


Figure 44

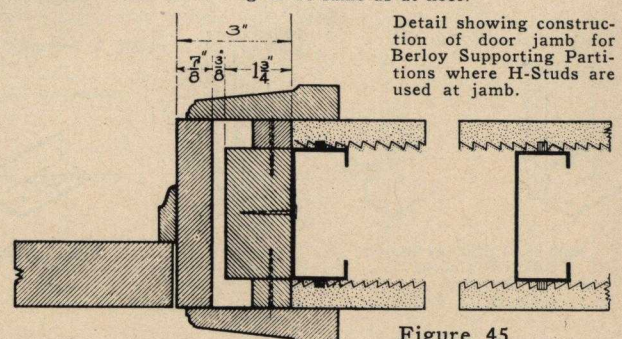


Figure 45



## STEEL JOISTS

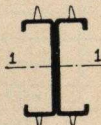
## STEEL STUDS

## Studs for Supporting Partitions

### Safe Loads and Properties of I Sections

## Safe Load in Pounds per Stud

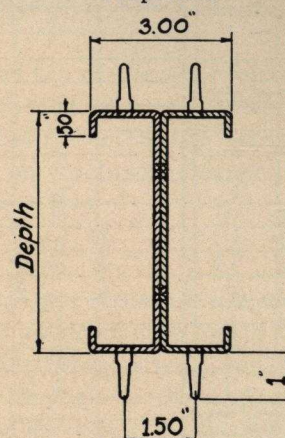
Values based on axis 1-1 for studs in partition construction. Fibre stresses=13,000 lbs. for lengths under 60 radii. For lengths over 60 radii fibre stresses computed by American Bridge Formula  $f = 19,000 - 100 l/r$ . No loads given where  $l/r$  exceeds 120.



| Depth     | 4"    |       | 5"    |       | 6"    |       | 7"    |       | 8"    |       |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Weight    | 3.60  | 6.00  | 4.10  | 6.80  | 4.60  | 7.60  | 5.30  | 8.80  | 6.00  | 10.00 |
| Thickness | .144  | .240  | .144  | .240  | .144  | .240  | .144  | .240  | .144  | .240  |
| Length    |       |       |       |       |       |       |       |       |       |       |
| 7' 0"     | 12640 | 21000 | 14500 | 24180 | 16400 | 27300 | 19180 | 31980 | 22000 | 36670 |
| 8' 0"     | 12250 | 20640 | 14500 | 24180 | 16400 | 27300 | 19180 | 31980 | 22000 | 36670 |
| 9' 0"     | 11460 | 19120 | 14500 | 24180 | 16400 | 27300 | 19180 | 31980 | 22000 | 36670 |
| 10' 0"    | 10690 | 17820 | 13880 | 23120 | 16400 | 27300 | 19180 | 31980 | 22000 | 36670 |
| 11' 0"    | 9910  | 16360 | 13170 | 21880 | 16300 | 27050 | 19180 | 31980 | 22000 | 36670 |
| 12' 0"    | 9140  | 15070 | 12430 | 20670 | 15550 | 25900 | 19180 | 31980 | 22000 | 36670 |
| 13' 0"    | 8360  | 13780 | 11710 | 19440 | 14890 | 24830 | 18960 | 31600 | 22000 | 36670 |
| 14' 0"    | 7580  | 12480 | 11160 | 18240 | 14190 | 23600 | 18280 | 30200 | 22000 | 36670 |
| 15' 0"    |       |       | 10240 | 17020 | 13500 | 22400 | 17580 | 29250 | 21660 | 36100 |
| 16' 0"    |       |       | 9510  | 15800 | 12800 | 21200 | 16880 | 28100 | 20990 | 34990 |

Total Web Thickness Given.

## Properties

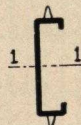


| Depth in ins. | Wt. per ft. lbs. | Flange Width in in. | Thickness Metal in in. | Thickness Web in in. | Net Area of sec. sq. in. |
|---------------|------------------|---------------------|------------------------|----------------------|--------------------------|
| 4             | 3.60             | 3.00                | .072                   | .144                 | .972                     |
| 4             | 6.00             | 3.00                | .120                   | .240                 | 1.620                    |
| 5             | 4.10             | 3.00                | .072                   | .144                 | 1.116                    |
| 5             | 6.80             | 3.00                | .120                   | .240                 | 1.860                    |
| 6             | 4.60             | 3.00                | .072                   | .144                 | 1.260                    |
| 6             | 7.60             | 3.00                | .120                   | .240                 | 2.100                    |
| 7             | 5.30             | 3.50                | .072                   | .144                 | 1.476                    |
| 7             | 8.80             | 3.50                | .120                   | .240                 | 2.460                    |
| 8             | 6.00             | 4.00                | .072                   | .144                 | 1.692                    |
| 8             | 10.00            | 4.00                | .120                   | .240                 | 2.820                    |

## Safe Loads and Properties of Channel Studs

## Safe Load in Pounds per Stud

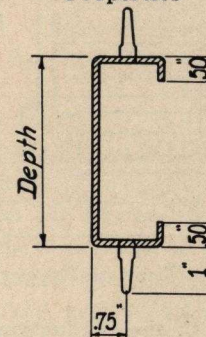
Values based on axis 1-1 for studs in partition construction. Fibre stresses 13,000 lbs. for lengths under 60 radii. For lengths over 60 radii fibre stresses computed by American Bridge Formula  $f = 19,000 - 100 l/r$ . No loads given where  $l/r$  exceeds 120.



| Depth     | 4"   |       | 5"   |       | 6"   |       | 7"   |       | 8"    |       |
|-----------|------|-------|------|-------|------|-------|------|-------|-------|-------|
| Weight    | 1.80 | 3.00  | 2.05 | 3.40  | 2.30 | 3.80  | 2.65 | 4.40  | 3.00  | 5.00  |
| Thickness | .072 | .120  | .072 | .120  | .072 | .120  | .072 | .120  | .072  | .120  |
| Length    |      |       |      |       |      |       |      |       |       |       |
| 7' 0"     | 6320 | 10530 | 7250 | 12090 | 8200 | 13650 | 9590 | 15990 | 11000 | 18335 |
| 8' 0"     | 6125 | 10370 | 7250 | 12090 | 8200 | 13650 | 9590 | 15990 | 11000 | 18335 |
| 9' 0"     | 5730 | 9560  | 7250 | 12090 | 8200 | 13650 | 9590 | 15990 | 11000 | 18335 |
| 10' 0"    | 5345 | 8910  | 6940 | 11560 | 8200 | 13650 | 9590 | 15990 | 11000 | 18335 |
| 11' 0"    | 4955 | 8180  | 6585 | 10940 | 8120 | 13650 | 9590 | 15990 | 11000 | 18335 |
| 12' 0"    | 4570 | 7535  | 6215 | 10335 | 7770 | 12950 | 9590 | 15990 | 11000 | 18335 |
| 13' 0"    | 4180 | 6890  | 5860 | 9720  | 7430 | 12340 | 9480 | 15800 | 11000 | 18335 |
| 14' 0"    | 3790 | 6240  | 5580 | 9120  | 7080 | 11800 | 9140 | 15100 | 11000 | 18335 |
| 15' 0"    |      |       | 5120 | 8510  | 6730 | 11200 | 8790 | 14625 | 10830 | 18050 |
| 16' 0"    |      |       | 4755 | 7900  | 6400 | 10600 | 8440 | 14050 | 10495 | 17495 |

Channel studs should not be used exclusively in supporting partitions, at least every fourth or fifth stud should be H section to afford stiffness to the structure.

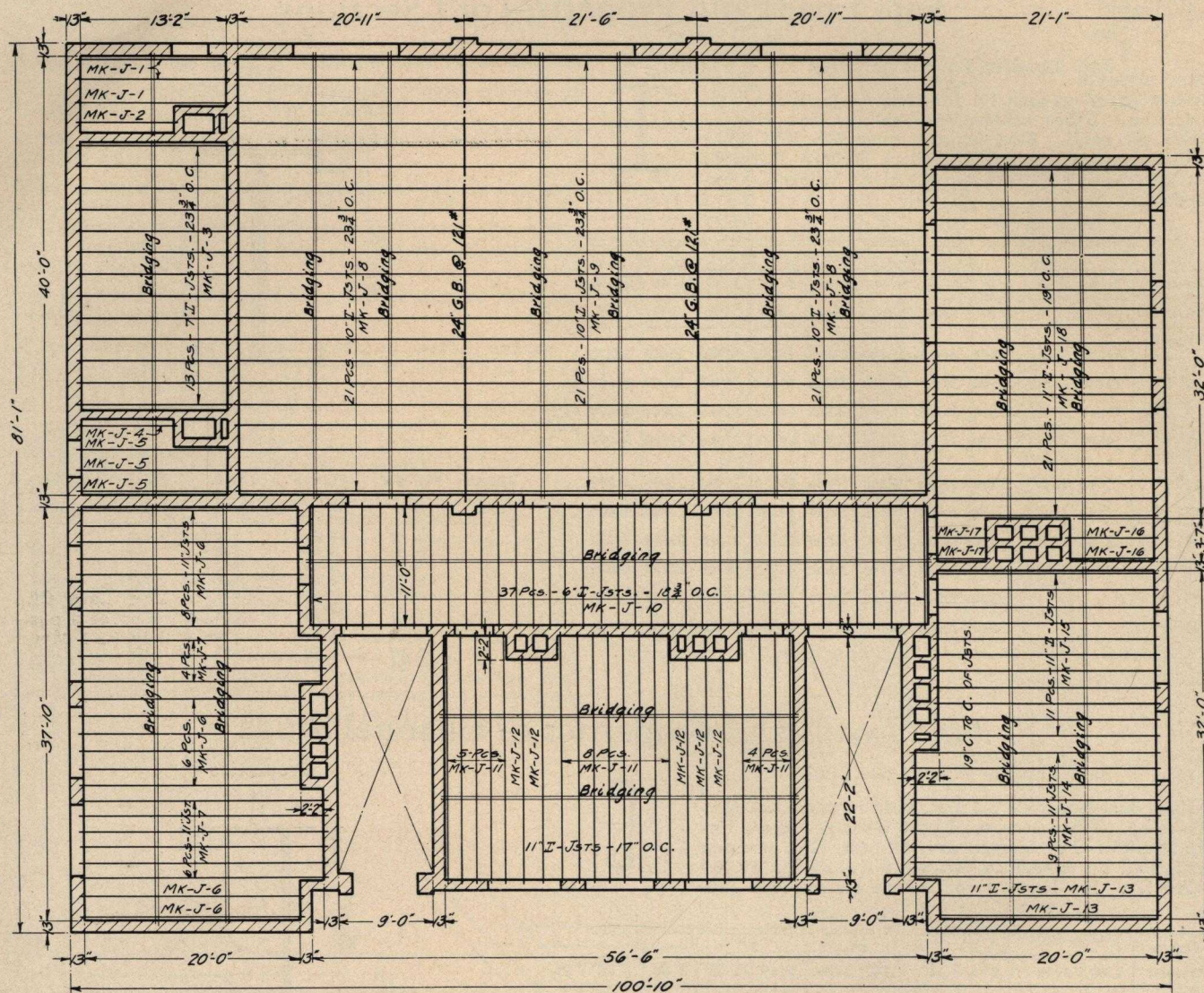
## Properties



| Depth in ins. | Wt. per ft. lbs. | Flange Width in ins. | Thickness of Metal in ins. | Net Area of sec. sq. in. |
|---------------|------------------|----------------------|----------------------------|--------------------------|
| 4             | 1.80             | 1 1/2                | .072                       | .486                     |
| 4             | 3.00             | 1 1/2                | .120                       | .810                     |
| 5             | 2.05             | 1 1/2                | .072                       | .558                     |
| 5             | 3.40             | 1 1/2                | .120                       | .930                     |
| 6             | 2.30             | 1 1/2                | .072                       | .630                     |
| 6             | 3.80             | 1 1/2                | .120                       | 1.050                    |
| 7             | 2.65             | 1 3/4                | .072                       | .738                     |
| 7             | 4.40             | 1 3/4                | .120                       | 1.230                    |
| 8             | 3.00             | 2                    | .072                       | .846                     |
| 8             | 5.00             | 2                    | .120                       | 1.410                    |



## Engineering Service



### Type of Erection Drawing Furnished by The Berger Manufacturing Company

In conjunction with the production and sale of Metal Lumber The Berger Manufacturing Company maintains a complete and efficient Engineering service on all forms of Metal Lumber floor, roof and partition construction.

Through this service is available the accumulated, practical experience of more than twenty years of designing Metal Lumber construction for practically every type of building, and form of construction in which Metal Lumber can be used.

This service offers—First—expert assistance in investigating the advantages and adaptability of Metal Lumber for any particular building or special condition.

Second—Designing Data, layouts, special detailing, and other co-operative service.

This bulletin supplies complete data to enable the Architect or Engineer to design Metal Lumber construction and many prefer to do so. Berger Engineers are always ready to assist by answering questions or supplying added details. If desired, they will prepare complete layouts from plans submitted by the architect with loads noted thereon.

Third—Estimates based on layouts prepared as above are supplied promptly with suggestions as to possible economies.

Fourth—In connection with installation of materials, erection drawings are supplied to insure the proper placing of the Metal Lumber, each piece of which is cut to fit and marked to correspond with identification marks indicated on erection diagrams.



## Erection Instructions

### UNLOADING—

Ordinary care should be exercised in unloading the joists so that the ends and flanges will not be damaged. Joists should be separated at this time according to the markings on them and on the erection drawings.

### SPACING—

The joists should be spaced on the supporting beams or walls at the spacing specified on the drawings. Spacing joists at the proper intervals in the beginning will eliminate rehandling later. If joists rest on top of beam, secure with beam clip as shown in Figure 6, page 10. If joists rest on shelf angles or joist hangers, no beam clips are used.

### STRIPPING—

Secure the joists temporarily in place by nailing a light wood strip along the top of the joists near the supports, by driving nails thru the strips down between the two channel sections of the joists. The spacing should be in accordance with that shown on erection drawings.

### BRIDGING—

Either wire or strap bridging can be used and should be applied at 6 foot intervals or at a spacing equivalent to one-third length of joist.

Bridging should always be anchored to the structural frame or into the brick walls. If wire bridging is used, the wire is cut into proper lengths to form a figure 8 around two joists, Fig. 7, page 11. The ends are then joined and tension introduced by twisting where the wires cross. If 1" x 20 gauge galvanized straps are used, two straps are anchored to the structural frame and then brought over and under the first joist, pulled taut with flat nosed pincers, and a 6d nail driven into the web of the joist. The strap passing under the joist is

pulled taut on the top of the next joist and secured into the web with a 6d nail. When scaffolding for plastering has been erected, the bridging may be pulled sidewise on the lower side of the joist and nailed in the same way.

### LATHING—

The nailing strips are removed and sheets of Ribplex Metal Lath secured, ribs up, to top of joists with 1 inch roofing nails or with wire lath clips as shown in Figure 10, page 11. If the floor finish is to be wood, nailing screeds are laid along center of joists on top of the lath and secured to joists with screed clips as shown in Figure 11, page 11, or by nailing into the web of the joist. Leveling is done at this time by means of wedges under the screeds.

### POURING—

A one and three-quarter inch fill is then poured between the screeds and leveled with a scraper. If floor finish is to be other than wood finish, a two-inch concrete slab is poured directly over the lath to serve as a base for any finish called for in the specifications. Proper temperature reinforcement should be supplied to take care of expansion and contraction in the finished floor.

### GENERAL—

Work on the upper decks can proceed as rapidly as the labor force permits. The speed with which this kind of construction can be completed in any kind of weather has made it popular in all sections. A small force of workmen can lay, space and bridge Metal Lumber quickly, easily and with a few simple tools. No expensive forms or hoisting equipment is required. Inspection is minimized. All sections are cut to length, plainly marked and every detail carefully and accurately taken care of in the erection drawings. Special details like framing around openings are included in the erection drawings.



## STEEL JOISTS

## STEEL STUDS

## Attachments and Accessory Materials

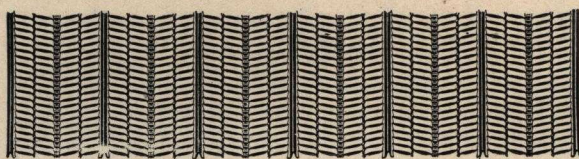
## The Berloy Metal Laths

Berloy Metal Lath in its various forms meets all the lath requirements for use with Berloy Metal Lumber. It offers positive fire protection, holds plaster or concrete firmly and offers an added factor of strength and stiffness in Metal Lumber construction.

$\frac{3}{8}$ " Ribplex meets most of the requirements.  $\frac{3}{4}$ "-inch Ribplex is used in one method of solid partition construction and also where great strength is a requirement. Berloy diamond mesh lath is usually preferred where studs or joists are spaced 16 inches on centers or less and for all formed work, such as beam protection.

Tables on this page and construction details on other pages indicate weight and type of Metal Lath best suited to the various uses.

Following are the various types of lath with general information as to weights sizes of sheets, etc.

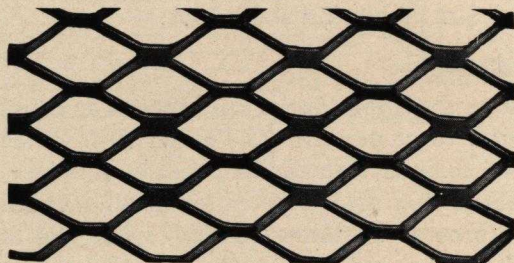
Berloy  $\frac{3}{8}$ " Ribplex

Sections across  $\frac{3}{8}$ -inch Ribplex Sheet. Ribs are  $\frac{3}{8}$ -inch high spaced 4 inches on centers.

| Weights Per Sq. Yard | Size of Sheets | Square Yards Per Sheet | Sheets Per Bundle | Square Yards Per Bundle |
|----------------------|----------------|------------------------|-------------------|-------------------------|
| 3.0 lb.              | 24"x102"       | 1.89                   | 9                 | 17                      |
| 3.5 lb.              | 24"x102"       | 1.89                   | 9                 | 17                      |
| 4.0 lb.              | 24"x102"       | 1.89                   | 9                 | 17                      |

The above weights apply to PAINTED STEEL and to PAINTED COPPER BEARING STEEL Berloy  $\frac{3}{8}$ " Ribplex. PAINTED TONCAN IRON  $\frac{3}{8}$ " Ribplex is made in only the 3.5 lb. and 4.0 lb. weights.

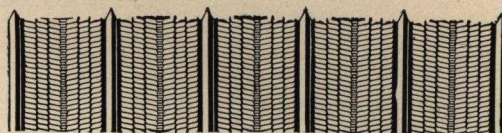
## Diamond Mesh Lath



Because of its forming qualities, we recommend Diamond Mesh Lath for all work where bending is required. Use  $\frac{3}{8}$ -inch Ribplex Lath for the straight-away work and you have the most satisfactory and economical combination.

| Weight Per Sq. Yard | Size of Sheets | Square Yards Per Sheet | Sheets Per Bundle | Square Yards Per Bundle |
|---------------------|----------------|------------------------|-------------------|-------------------------|
| 2.2 lb.             | 24"x96"        | 1.78                   | 9                 | 16                      |
| 2.5 lb.             | 24"x96"        | 1.78                   | 9                 | 16                      |
| 3.0 lb.             | 24"x96"        | 1.78                   | 9                 | 16                      |
| 3.4 lb.             | 24"x96"        | 1.78                   | 9                 | 16                      |

The above weights apply to PAINTED STEEL, PAINTED COPPER BEARING and PAINTED TONCAN IRON LATH. Diamond Mesh Lath can also be furnished cut from GALVANIZED SHEETS in 2.5 lb. and 3.4 lb. weights.

Berloy  $\frac{3}{8}$ " Ribplex

## A Ribbed Reinforcement

Berloy  $\frac{3}{4}$ -inch Ribplex is a combined reinforcement and centering for use in the construction of concrete floors, roofs, walls and tanks. Also a heavy weight Expanded Metal Lath for use on extremely wide spacing of studs or supports and for solid studless partitions.

| Ga. | Weight Per Sq. Ft. | Total Sect. Area Per Foot | Width of Sheets | Length of Sheets |
|-----|--------------------|---------------------------|-----------------|------------------|
| 28  | .50 lbs.           | .1406 sq. in.             | 24"             | 4', 5', 6', 7'   |
| 26  | .60 lbs.           | .1688 sq. in.             | 24"             | 8', 9', 10'      |
| 24  | .75 lbs.           | .2250 sq. in.             | 24"             | 11' and 12'      |

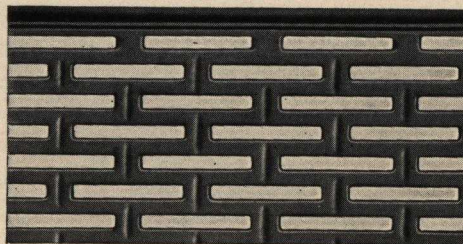
The above information applies to Painted Steel  $\frac{3}{4}$ -inch Ribplex. Not furnished in Copper Bearing, Toncan IRON or Galvanized Steel.

## Corrugated Diamond Mesh Lath



Corrugated Diamond Mesh Lath can be furnished in any of the weights shown in the above table and in either PAINTED STEEL, COPPER BEARING, TONCAN IRON or GALVANIZED STEEL. The corrugations or beads are approximately  $\frac{3}{8}$  inch high and 3 inches on centers. This is a self-furring Diamond Mesh Lath and is very satisfactory for all plastering purposes.

## Berloy Sheet Lath



This is a perforated Sheet Metal Lath and is not expanded. Because of its plaster clinching qualities and extreme rigidity Berloy Sheet Lath is particularly adaptable to tile back up and similar work. The bead at side of sheet gives a positive and satisfactory side lap.

Weight per square yard, 4.50 lbs. Size of sheets, 18"x96". Sq. yds. per sheet 1.33. Sheets per bundle, 9. Sq. yds. per bundle, 12.

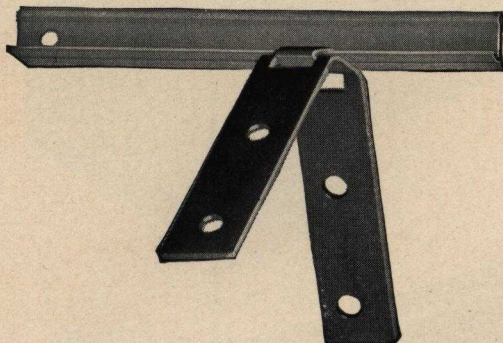


STEEL JOISTS

STEEL STUDS

# Attachments and Accessory Materials

## Berloy Corner Beads



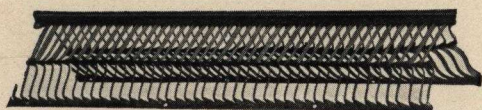
## Rail Bead

Made from 24 gauge Galvanized Steel. One clip supplied with each lineal foot. Stock lengths, 6, 7, 8, 9, 10 and 12 ft. Shipped in bundles of 25 pieces. Weight, 180 lbs. per 1,000 feet, including weight of clips.



## Wing Bead

Made from 26 gauge Galvanized Steel. Stock lengths, 6, 7, 8, 9, 10, 11 and 12 ft. Width of perforated wing approximately 1 3/8". Shipped in bundles of 10 pieces. Weight, 175 lbs. per 1,000 feet.



## Protex Expanded Corner Bead

Stock lengths are 6, 7, 8, 9, 10 and 12 feet. Width of expanded wing approximately 3" overall. Packed 75 pieces to each crate. Weight, 250 lbs. per 1,000 feet, crated.

## Cold Rolled Channels

All places where non-bearing supports are required, Berloy Cold Rolled Channels should be used. Rolled straight and true, they make a perfect and attractive partition or ceiling. The smaller sizes can readily be bent on the job for formed work. Wire Ribplex or other types of metal lath to these channels and you have a permanent fireproof partition or ceiling.

| Size          | Gauge | Weight Per 1,000 Lin. Ft. |
|---------------|-------|---------------------------|
| 3/4" x 3/8"   | 16    | 276 lbs.                  |
| 1" x 3/8"     | 16    | 332 lbs.                  |
| 1 1/2" x 3/8" | 16    | 442 lbs.                  |
| 2" x 3/8"     | 16    | 553 lbs.                  |
| YO. Box       | ..    | 276 lbs.                  |
| YO. Pencil    | ..    | 113 lbs.                  |

Stock lengths, 16 ft., 18 ft. and 20 ft., except Pencil Channels, which are only carried in stock lengths of 12 ft. and 14 ft. 3/4", 1", YO. Box and YO. Pencil Channels are packed 20 pieces to the bundle, while the 1 1/2" and 2" Channels are packed 10 pieces to the bundle.

## Strength of Slabs

The following table indicates the strength of the concrete slab used in connection with Berloy Metal Lumber floor construction.

Total safe loads in pounds per square foot on concrete slabs reinforced with 3/8-inch Berloy Ribplex and B. B. Lath, based on Berloy Pressed Steel Joist spacings, as follows:

| Depth of Slab | Spacing on Centers in Inches             |      | Slabs Reinforced with 3/8-Inch Ribplex |       |       |       |
|---------------|------------------------------------------|------|----------------------------------------|-------|-------|-------|
|               | Slabs Reinforced with 3.0 % Diamond Lath |      | Slabs Reinforced with 3/8-Inch Ribplex |       |       |       |
|               | 12"                                      | 16"  | 19"                                    |       | 24"   |       |
|               |                                          |      | 3.0 %                                  | 4.0 % | 3.0 % | 4.0 % |
| 1 1/2"        | 1178                                     | 684  | 232                                    | 307   | 151   | 200   |
| 2"            | 1595                                     | 927  | 314                                    | 414   | 205   | 269   |
| 2 1/2"        | 2000                                     | 1160 | 394                                    | 520   | 257   | 338   |
| 3"            | 2430                                     | 1412 | 475                                    | 634   | 310   | 412   |

The shearing stresses produced by the above loadings vary from 7 to 37 pounds per square inch on the cover sectional area of the concrete slab.

## Attachment of Lath

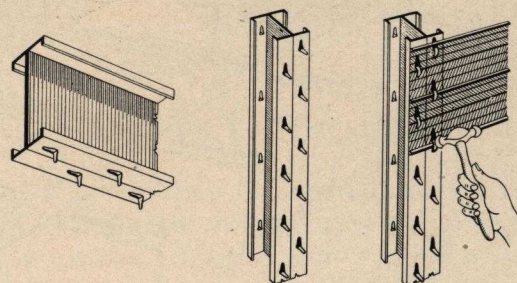


Figure 46

The Standard Metal Lumber sections are usually pronged for the attachment of Metal Lath and Ribplex. The meshes of the lath are pushed over the prongs which are driven back and down to make a secure attachment. It is not practical to prong the heavier or .120" thickness of Metal used in Metal Lumber for special requirements and with these sections holes are punched if desired, for the attachment of lath by wiring with 16 ga. wire. Berloy "H" and channel studs and channel joists may be pronged or punched on both sides. Berloy "I" joists may be pronged or punched on bottom flanges for the attachment of ceiling lath, but they are not pronged or punched on the top, as the use of nails is more practical and the entire strength of the joist is thus preserved at the point of greatest compressive strain. In some cases the use of spring lath clips is preferred to nail, prong or wire attachments.

## Spring Lath Clips

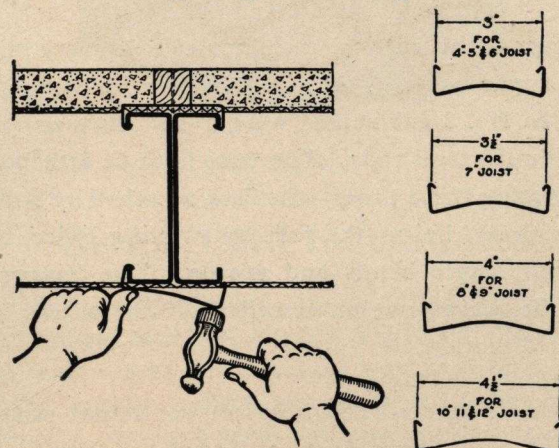


Figure 47

SPRING LATH CLIPS



## Suspended Ceilings

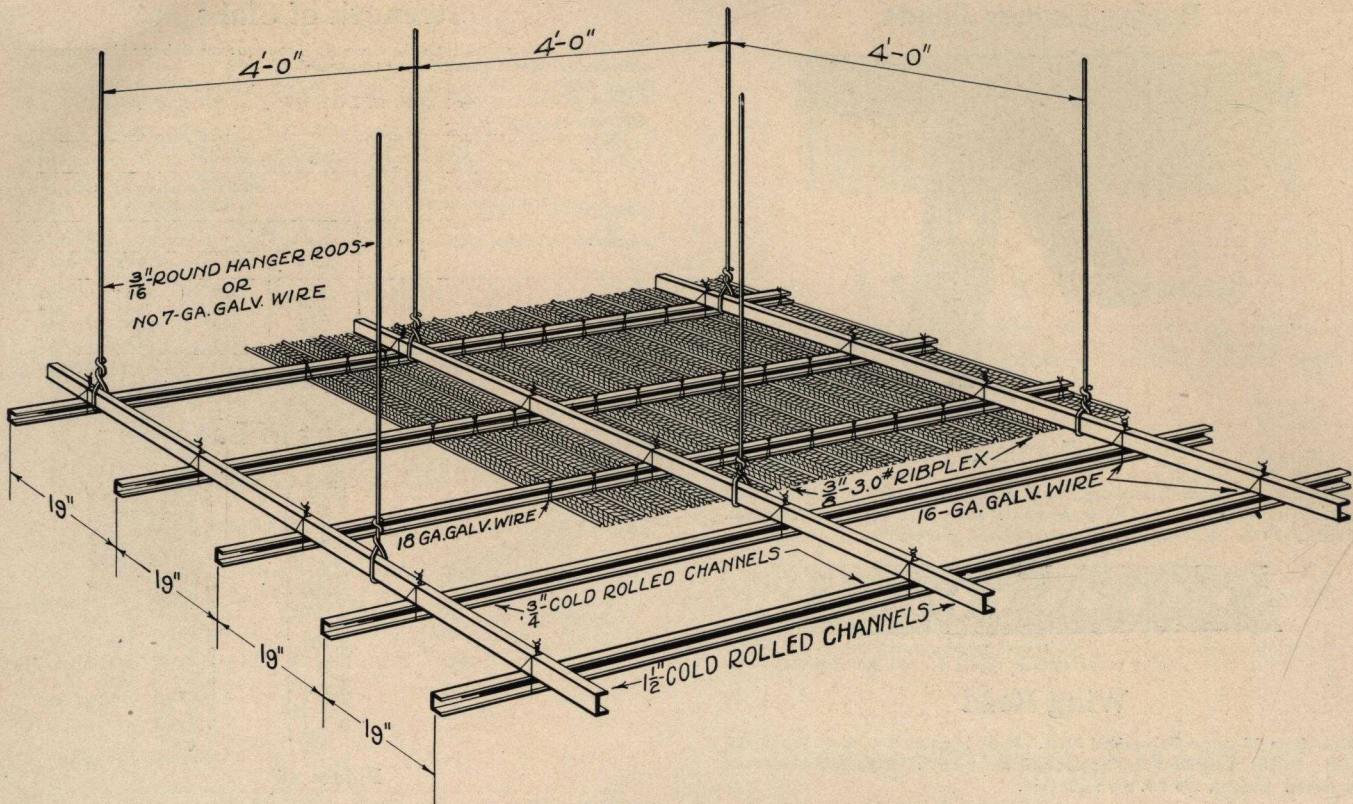


Figure 48

The following specifications are adapted to all types of suspended ceilings and will be found entirely satisfactory when used with Berloy Metal Lumber construction, using Berloy Metal Lath or Ribplex and Berloy Cold Rolled Channels.

**Hangers**—The vertical members which carry the steel frame work. The minimum size for hangers shall be No. 8 galvanized wire, 1"x $\frac{3}{16}$ " flats or  $\frac{7}{8}$ " round mild steel rods. The wire is to be attached by twisting three times—the flats, attached by bolting with  $\frac{3}{8}$ " bolts—the rods by twisting twice, or by right angle bends and wiring. The hangers shall be spaced not to exceed 4' 0" on centers in either direction.

**Runner Channels**—The heaviest horizontal members. Runner channels are to be not less than 1 $\frac{1}{2}$ " channels with a minimum weight of .442 lb. per lin.

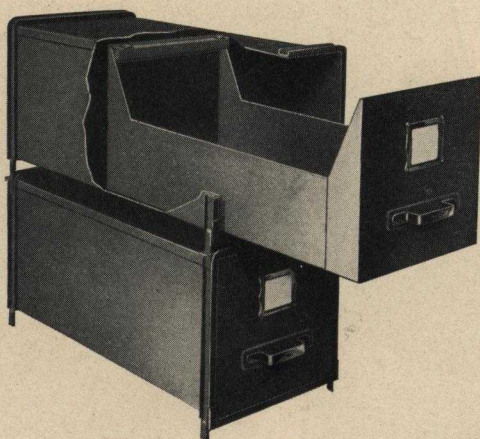
ft. They shall be spaced not to exceed 4' 0" on centers.

**Furring Channels**—The smallest horizontal members to which the lath is attached. Furring channels shall be not less than  $\frac{3}{4}$ " channels with a minimum weight of .276 lb. per lin. ft., and shall be attached to the runner channels by at least three loops of No. 16 galvanized wire at each intersection. The furring channels shall be spaced at various centers, depending upon the lath to be used. A maximum spacing of 12" shall be used for 3 lb. B. B. lath; 16" spacing for 3.4 lb. B. B. lath and 19" centers for 3 lb. Ribplex lath.

**Metal Lath**—The plastering base and reinforcement. Metal lath shall weigh not less than 3 lbs. per sq. yd. It shall be attached to the furring channels by No. 18 gauge galvanized annealed lathers' wire every six inches along the furring channels.



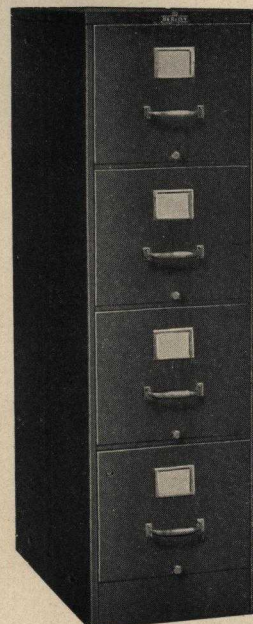
# Berloy Steel Filing Cases



No. 494

## Berloy Transfer Units

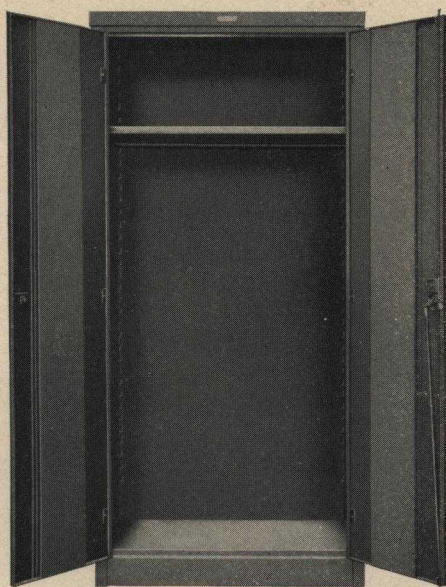
Economical protection for your seldom-referred-to but nevertheless valuable records. The heavy cold-rolled channel frame permits stacking them to the ceiling, if your floor space is limited. Excellent for use as shop files. Made in letter, cap, bill and ledger size.



No. 694

## Berloy Letter Files

A Berloy Steel Filing Cabinet will keep your letters, bills and other valuable papers in a safe and orderly manner. The file shown above will hold 20,000 letters. Drawers operate easily on roller bearing suspensions. Can be fitted with Yale paracentric key lock controlling all drawers simultaneously. Made in all standard sizes.



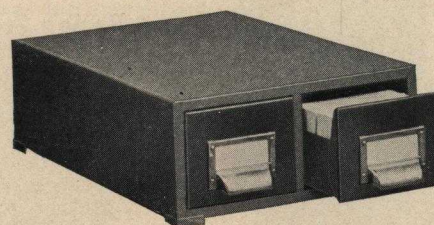
No. 8561

## Berloy Wardrobe Cabinet

No. 8561

For wardrobe use this cabinet is fitted with one shelf about 10 inches from the top with a coat-hanger rod directly below. It is widely used for office wardrobes and for the storage of uniforms and vestments in lodges and churches. The cabinet is equipped with a substantial flat key lock. The three point locking device on Berloy Cabinets holds the doors firmly at top, center and bottom. Write for Bulletin on complete line of other Berloy Storage Cabinets.

Size 36" wide, 18" deep, 78" high.

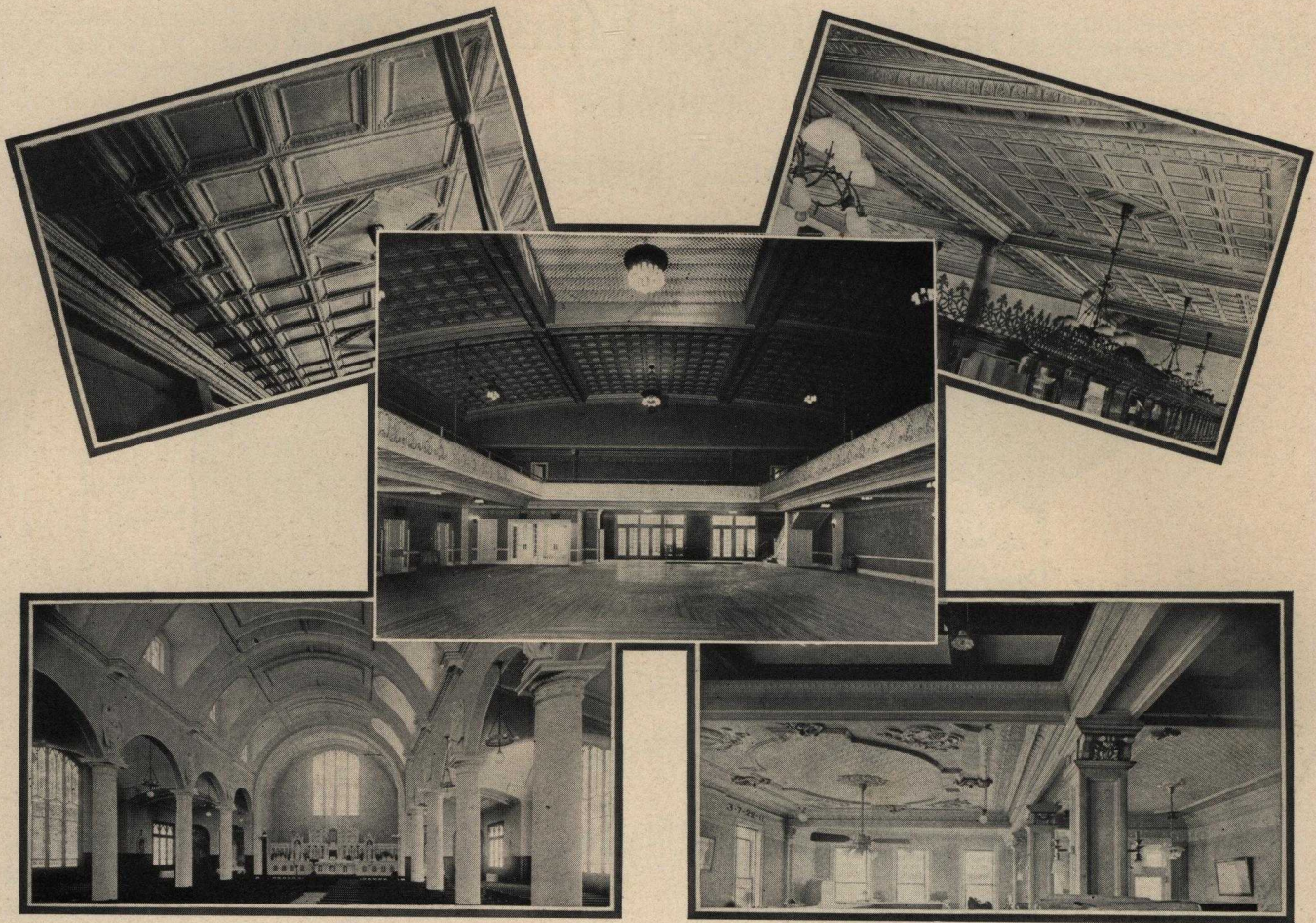


No. 7053-7064

## Berloy Card Index Cases

Berloy Steel Card Cases are made in both one and two drawer units for cards 5 x 3, 6 x 4 and 8 x 5. An inexpensive and accurate way to keep a card record system. Each drawer will accommodate over one thousand cards with the necessary guides. Cases are fitted with attractive brass label holders and pulls. Locks can be applied if desired, on either single or double drawer cases.



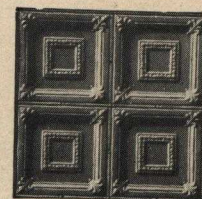
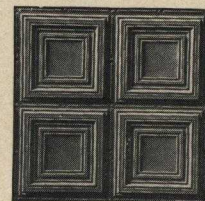
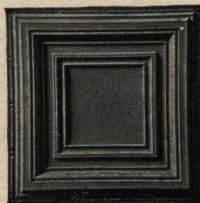
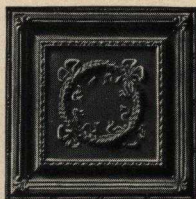


## Berloy Steel Ceilings

### *Simplified Erection*

Berloy Steel Ceilings are easily erected because of the pressed bead and button construction. The bead is made extra long in the shape of half an oval. It reinforces the ceiling plates at joints and fits snugly over underlapping bead, making a tight and perfect fitting joint. The top of the nailing button is counter-sunk. This prevents the nail from slipping while being driven and also acts as a guide for the erector in placing the nail at the correct nailing point.

Berloy Steel Ceilings are made in a wide variety of designs, to harmonize with any plan of decoration and furnishings. Send us the dimensions and we will give you an estimate on a steel ceiling that will be a source of permanent satisfaction and protection.



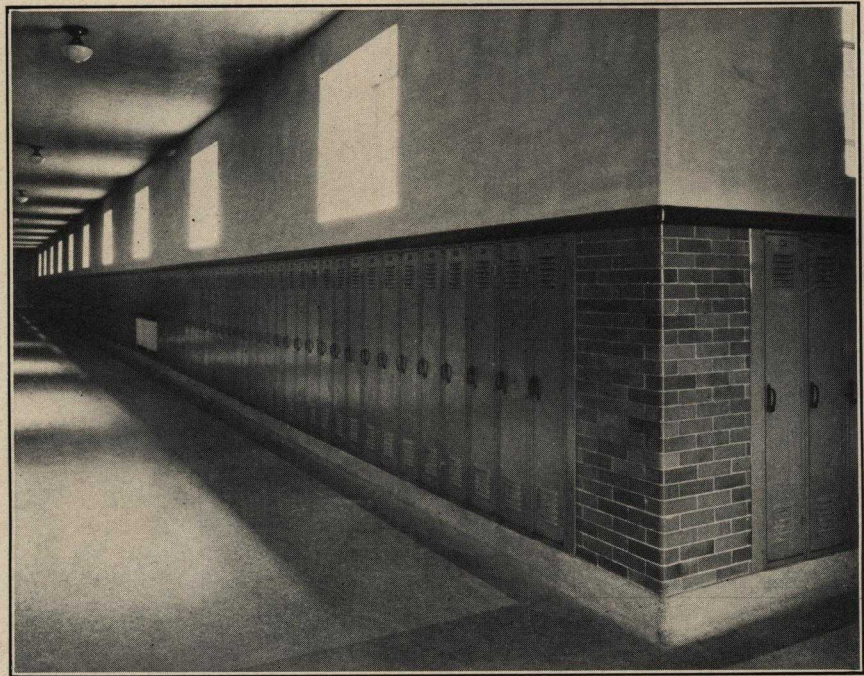


# Berloy Steel Lockers

There is a Definite Type of Berloy Locker for Every Requirement



Type S. S.  
Single Tier, Standard Louvre

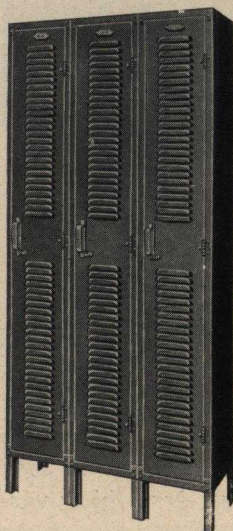


Berloy Steel Lockers are the product of men who have absolute control of every process in their manufacture from raw iron ore to finished product. In one plant this unhampered control over every phase of production is directed successfully toward the attainment of excellence in Berloy Lockers.

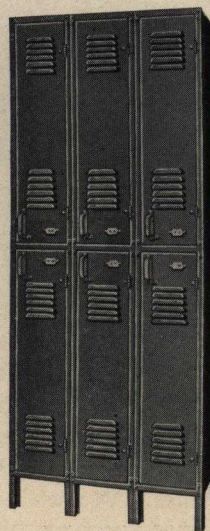
An engineering force is prepared to assist you with your locker problems by submitting plans and suggestions for your approval. This service is yours for the asking. A card will bring our catalog together with prices and complete information concerning the types best adapted to your needs.

Proper arrangement of locker equipment has an important bearing on the cost. The wide range of Berloy standard types and sizes makes possible economical arrangement for practically any requirement.

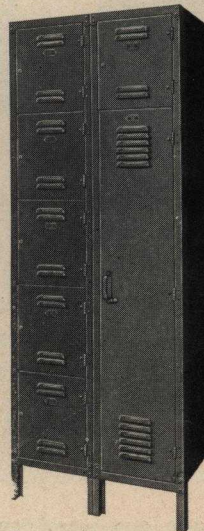
Berloy Steel Lockers recessed in corridor walls prove the most efficient and systematic arrangement for schools. Where the construction of the building does not permit of recessed lockers, Berloy standard lockers with 6-inch leg base will give a very satisfactory installation. Double tier lockers can be installed where floor space is limited. A number of different arrangements is possible and our engineers are specialists in planning the most efficient arrangement for every requirement, utilizing floor space to the maximum.



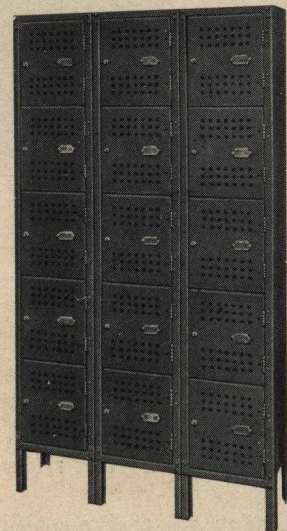
Type F. S.  
Single Tier, Full Louvre



Type S. D.  
Double Tier, Standard Louvre

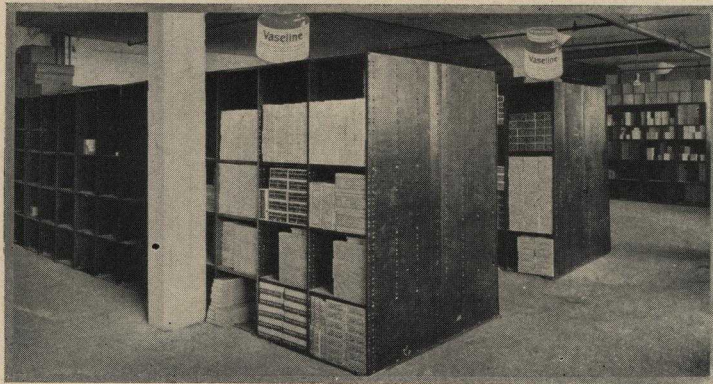
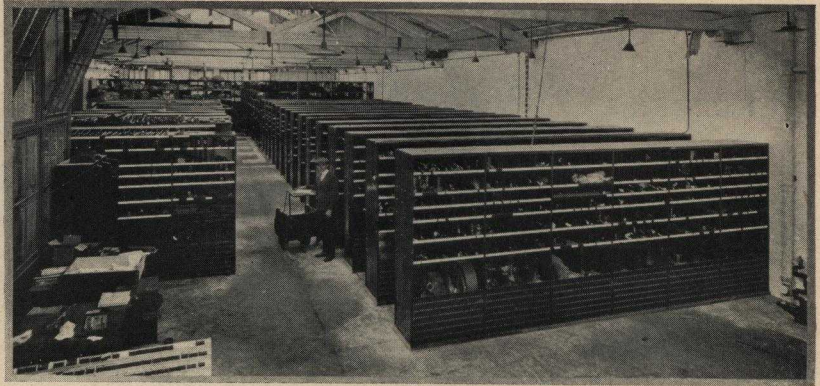
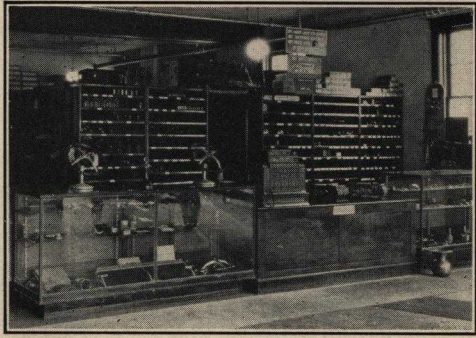


Type G. No. 2856  
Combination Locker



Type C  
Compartment Locker





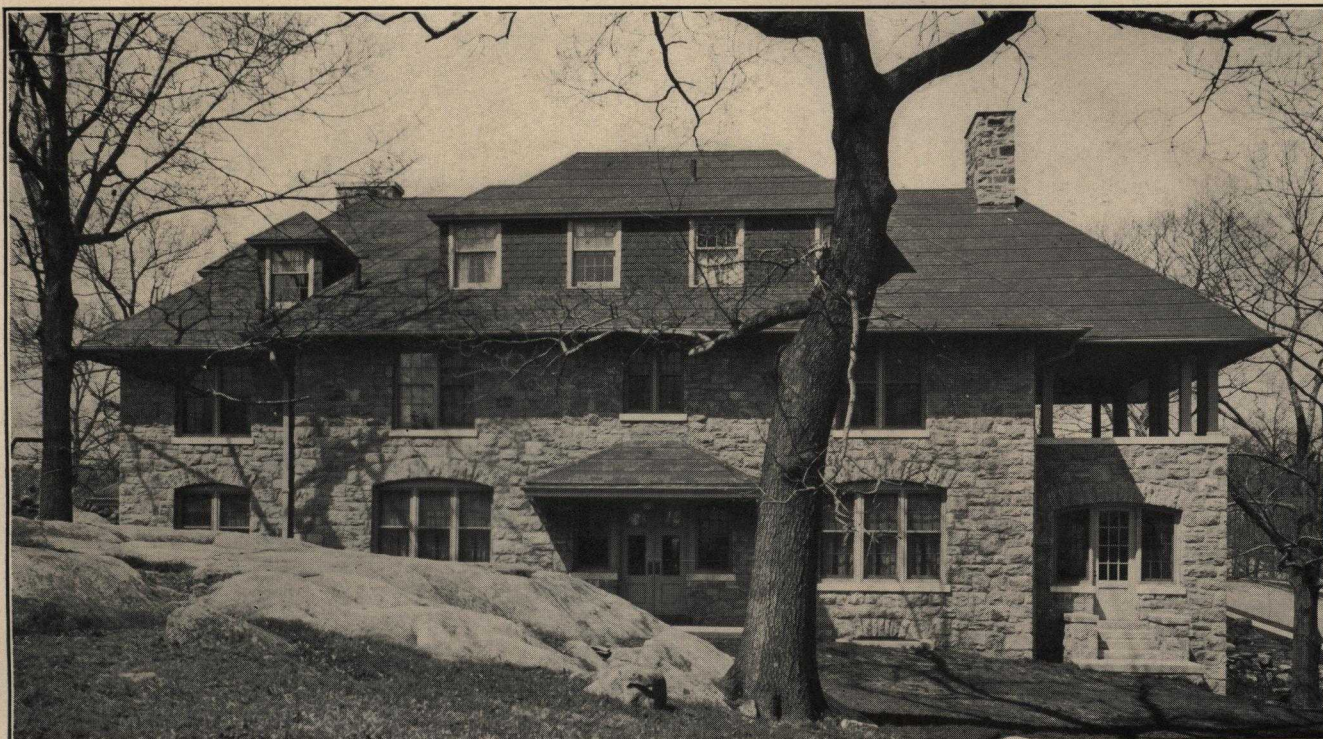
## Berloy Steel Shelving

There is a type of BERLOY shelving to meet every stock and storage requirement. From the finest of retail store installations to the heavier types for the systematic storage of heavy parts, castings and patterns, we will be glad to work with you on your shelving needs.

Under general classification we are equipped to furnish the following: Industrial, Automotive and

Retail. Under each one of these general classifications there are styles and types of construction and assembly to exactly fit the material to be stored. We will make practical recommendations upon receipt of available floor space, kind of material to be stored and whether or not shelving is to be seen by public. We will send catalogs describing various lines and any other desired information upon request.





Metal Lumber Residence of Prof. George B. Pegram, New York City

## BRANCH OFFICES

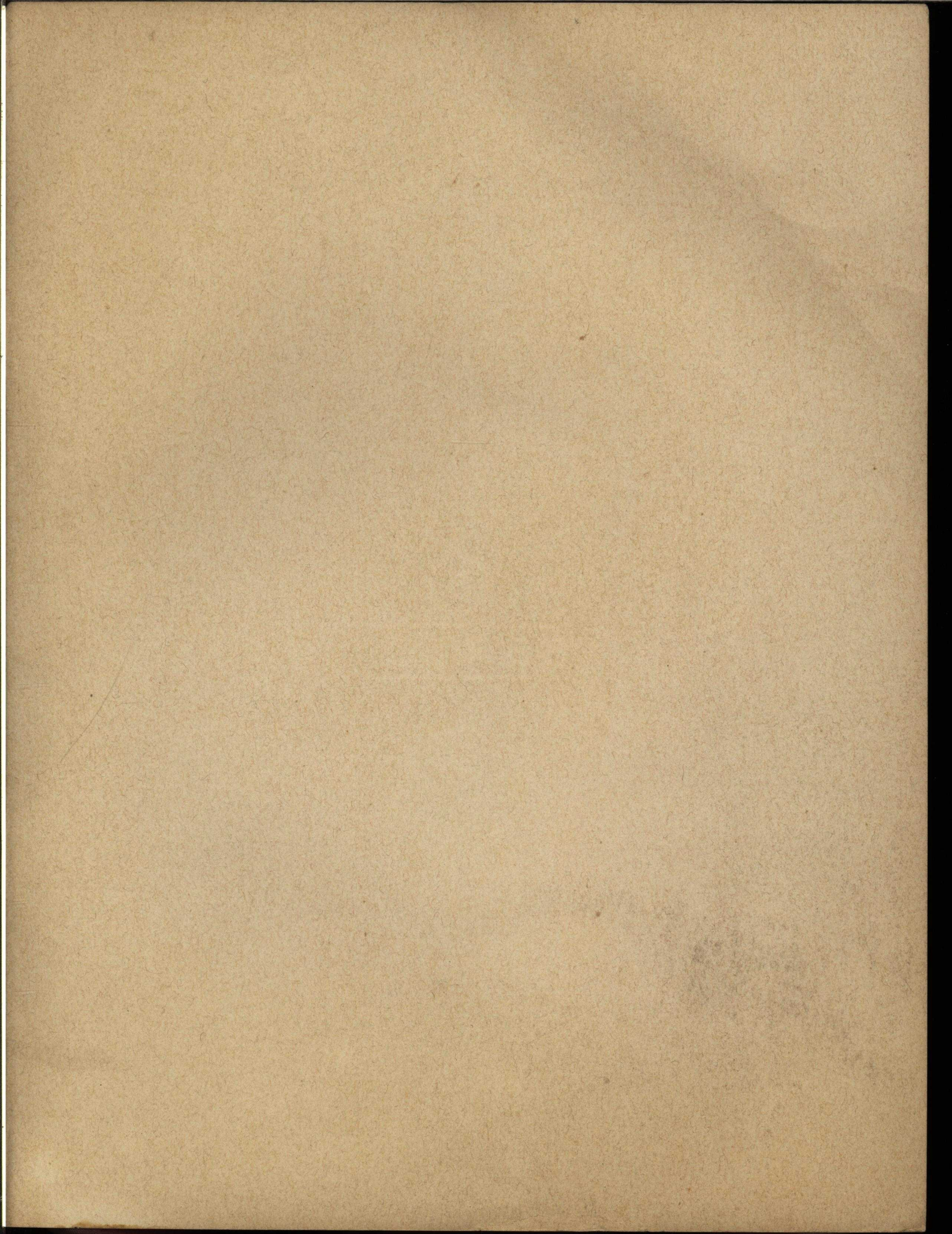
|                     |                         |                     |
|---------------------|-------------------------|---------------------|
| The Berger Mfg. Co. | 307-15 Dorchester Ave.  | S. Boston, Mass.    |
| The Berger Mfg. Co. | 514-24 W. 25th St.      | New York City       |
| The Berger Mfg. Co. | 16th & Washington Ave   | Philadelphia, Pa.   |
| The Berger Mfg. Co. | 3622 S. Morgan St.      | Chicago, Ill.       |
| The Berger Mfg. Co. | 3rd & Russell Ave.      | St. Louis, Mo.      |
| The Berger Mfg. Co. | 1701-29 Broadway, N. E. | Minneapolis, Minn.  |
| The Berger Mfg. Co. | 14th & Charlotte Sts.   | Kansas City, Mo.    |
| The Berger Mfg. Co. | Corinth & Pearl Sts.    | Dallas, Texas       |
| The Berger Mfg. Co. | 122 S. Central Ave.     | Los Angeles, Cal.   |
| The Berger Mfg. Co. | 1120 Mission St.        | San Francisco, Cal. |
| The Berger Mfg. Co. | Walnut Ave., E.         | Roanoke, Va.        |
| The Berger Mfg. Co. | 28th & Evergreen Ave.   | Jacksonville, Fla.  |
| The Berger Mfg. Co. | 113 Seventh Ave.        | Long Island City    |

District Offices Located in Principal Cities











  
BERLOY